ADMISSIBILITY OF CRANIOFACIAL SUPERIMPOSITION EVIDENCE AS A MEANS OF FORENSIC IDENTIFICATION IN MALAYSIA

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ABSTRACT

Craniofacial superimposition is a method of comparing the characteristic features of a skull with a photograph of a person whose identity is known. As a technique to aid the personal identification of unknown human remains, it is not new, and its application can be traced back to the late 19th Century. It can be used not only in the identification of the dead but also the living and is fast becoming an important method in forensic anthropology. This is because surveillance cameras are often employed as silent witnesses in crime scenes such as at banks, convenience stores and airports. This research will outline the developments in the field of craniofacial superimposition, from the earliest method of using viewing boxes, slide projector and overhead projector, to that of video technology and now to the incorporation of *e-* technology. The eight cases of superimposition conducted by the Malaysian police authorities, of which three have reached the courts of law, will be discussed in depth. This will show the practical aspects of facial superimposition which could be a guide for enforcement officers in their pursuit for justice. The legal implications of such evidence are also discussed. The question of relevancy and admissibility of the opinion evidence of the craniofacial superimposition expert has been an issue in the courts and this research will delve into its merits. Creating an awareness on the legal and scientific validity of this field of identification will ensure that more such applications are accepted by the Malaysian courts.

ABSTRAK

'Craniofacial superimposition' ialah suatu cara perbandingan ciri-ciri sesuatu tengkorak dengan gambar seseorang yang diketahui. Sebagai satu cara pengenalan identiti rangka manusia, ia bukan baru, akan tetapi asal usulnya boleh di kenalpasti sejak abad ke -19. Ia boleh digunakan untuk mengenalpasti identiti seseorang yang hidup mahupun orang yang telah meninggal dunia dan ia kian memainkan peranan yang lebih dalam antropologi forensik kerana kamera pengitipan sering digunakan dalam bank-bank, kedai-kedai mahupun di lapangan terbang. Kertas kerja ini akan mencatatkan perkembangan penjurusan 'craniofacial superimposition' dari permulaannya iaitu dari 'slide projector' dan 'overhead projector' hinggakan ke technologi video dan teknologi *e*. Kelapan-lapan kes yang disiasat oleh polis Malaysia juga di bincang dengan mendalam agar ia dapat dijadikan sebagai petua untuk penyiasatan yang akan datang. Implikasi perundangan khususnya soalan 'relevancy' dan 'admissibility' keterangan pakar yang sering disoal dimahkamah dibincang agar jurusan ini memainkan peranan yang lebih dalam penyiasatan oleh pihak yang berkenaan.

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INTRODUCTION

One of the main purposes in forensic science is that of determining identity. Human identification may not be as easy as it sounds particularly so if there is a badly mutilated, incinerated, or mangled body or worse still if there is only a skeleton left. With most of these death enquiries, the identity of the deceased is already known by virtue of the surrounding circumstances of the death. But for a minority of cases the identity of the deceased initially remains in doubt. Clement (1998) states that this typically makes up 0.1% of all medical examiner cases in the west.

Identification of the human victim or assailant is necessary to satisfy legal, insurance and social requirements and this may be achieved by several methods, i.e. direct visual , fingerprint, dental, radiographic, DNA analysis etc. Where foul play is suspected, it is essential to establish the identity of the deceased using the strictest possible criteria. Unequivocal identification of the victim is of almost paramount importance in such cases, and identity may have to be linked to levels of certainty that amount to proof 'beyond reasonable doubt' rather than only 'on a balance of probability'[1].

The simplest method of identity verification is that of visual identification. Facial identification by visual means is routinely carried out throughout the world on fresh

[1] Rangapula & Anor v PP (1982) 1MLJ 91 held that where the evidence of identity is poor then there is a need for supporting evidence as to the identification of an accused.

bodies by relatives and other acquaintances of the deceased. Legal confirmation of identity in these cases is simply a matter of observing the legal formalities rather than applying any special medical and forensic procedure.

In more difficult cases, bodies may have significant injuries and be disfigured. They may be completely unrecognizable by any conventional criteria. Decomposition processes involving bloating of the body, blackening of the skin and loss of tissues such as eyes, skin, hair and nails interfere markedly with the likelihood of successful visual identification.

In such circumstances where visual recognition and property identification have failed to give any clue on the identity of a person, the other modes of identification like the use of fingerprints and dental records are used by the police who then would seek the assistance of forensic pathologists and odontologists[2] . There are, however, cases in which such an identification system is not possible due to either the difficulty of obtaining dental records or other confirmatory evidence, such as fingerprinting.

The forensic investigator may than consider facial reconstruction if no comparative photographic material is available, or some form of superimposition of available photographs onto the skull. It should be appreciated that such methods are used in conjunction with other corroborative methods, such as the finding of personal

[2] Forensic odontology has helped police solve several murder cases including that of the much publicized Batu Talam State Assemblyman Datuk Mazlan Idris in July 1993. Forensic odontologists had also assisted police in bite-mark investigations, lip print identification particularly in child abuse or rape cases. http://www.law-forensic.com/cfr_bite_4.htm

belongings and skeletal findings that may be present due to previous trauma, hospital therapy, congenital or acquired skeletal anomalies.

Thus when skeletal remains are found, and the victim remains unidentified after traditional means of identification, investigators may either call upon the forensic artist to utilize the ***three-dimensional facial reconstruction technique***[3] , or he may use the method of ***craniofacial superimposition.***

The three-dimensional facial reconstruction process is initiated by placing the skull on a workable stand and by utilizing proper tissue depth data determined by race, gender, and age, artificial eyes are placed in the skull's eye sockets, centered and at the proper depth. The tissue markers are then glued directly onto the skull where clay will be systematically applied directly on the skull, following the skull's contours, paying strict attention to the applied tissue markers.

Information such as geographic location of where the deceased lived, his or her lifestyle, and the various information provided to the artist by the police, is heavily relied upon when completing the reconstruction. Various items (props), such as glasses, clothing, hats, etc. may be applied to better accentuate the features of the individual.

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[3]Examples of forensic reconstruction links on the net are:- www.forensicartist.com/reconstruction.html, www.forensicartist.com/hep.
See also articles by George, R.M. , The Lateral Craniofacial Method of Facial Reconstruction, *Journal of Forensic Sciences* (1986) pp. 1305-1330. ,
Morier, R.L. , Forensic Facial Reconstruction, *Royal Canadian Mounted Police Gazette,*(1993) Vol: 55 , No:2

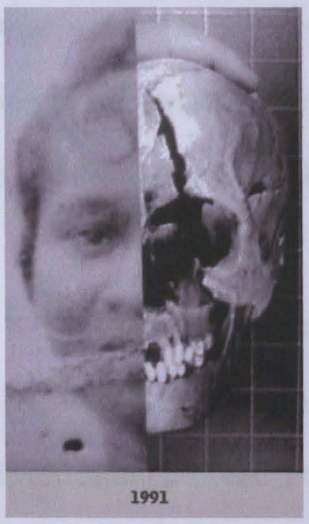
Upon completion, the sculpture is photographed. When executed properly, this technique is proven to have a high success rate. Unfortunately we in Malaysia do not have the expertise in this field.

Three-Dimensional Facial Reconstruction[4]

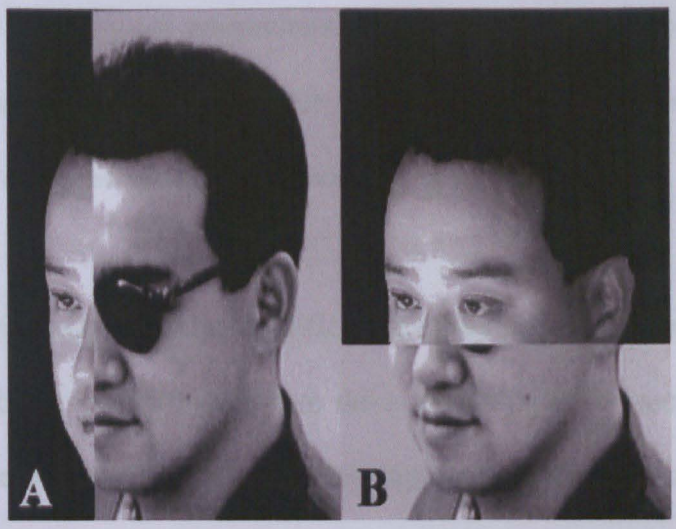
Superimposition on the other hand means 'To lay or impose on something else – the act of superimposition or the state of being superimposed."[5] Thus by definition, to superimpose something is to 'set it or place it on or above something else'. In a forensic context such a procedure can have many applications for example in the comparison of tool marks. In effect craniofacial superimposition is a method of comparing the characteristic features of a skull with a photograph of a person whose identity is known. Superimposition works as an identification technique by putting one image of a person on

[4] http://www.forensicartist.com/hep/clem/3drecon.html
[5] Webster's New Collegiate Dictionary, 7th Ed.

top of another[6], for example a photographic image of a missing person could be superimposed onto a computerized facial reconstruction from an excavated skull to check for similarities. It works as an identification technique both for the dead as well as for the living.



Craniofacial superimposition of the dead.[8]



Craniofacial superimposition of the living[7]

Facial image identification (craniofacial superimposition) is becoming an important theme in forensic investigation[9] because of the ever increasing use of surveillance cameras as silent witnesses in crime scenes such as convenience stores, banks and now more recently at airports and other places of security enforcement. Facial

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[6] In fact it often argued that there is nothing scientific in adjusting the size of the negative image of the skull to fit in with the image of the face. In fact, it is possible to fit a skull with photographs of different persons. To be more scientific, the negatives should be enlarged to the life size, independently , and they should then be superimposed.

[7] http://www.fbi.gov/hq/lab/fsc/backissu/jan2001/yoshino.htm

[8] http://www.fbi.gov/hq/lab/fsc/backissu/oct2000/ubelaker.htm

[9]Clinical specialist and lecturer Dr Phrabhakaran Nambiar of the Department of Oral Biology at the Faculty of Dentistry at University Malaya is the only forensic odontologist in the country who has worked in this field. http://www.law-forensic.com/cfr_bite_4.htm

image identification is carried out to determine whether a facial image at the scene of a crime is that of a suspect. The prominence played by this mode of identification was shown by the way the FBI and other investigative units carefully elucidated the identities of the suspected hijackers in the recent attack on the World Trade Centre from video images captured from airport security cameras. Despite some reluctance to use superimposition for positive identification, most researchers agree that this technique provides good corroborative evidence to reinforce a probable identification and, in some cases good evidence for exclusion of a suggested identification[10].

The role of craniofacial superimposition in the identification of the suspects in the Sept 11 attack had spurred the idea for an in-depth study into the methodologies for such an identification process. Thus this research will outline the developments in the field of craniofacial superimposition, from the earliest method of using viewing boxes, slide projector and overhead projector, to that of video technology and now to the incorporation of ***e***- technology.

Further, in line with the administration of criminal justice, the eight cases of superimposition conducted by the Malaysian police authorities will be discussed in depth. This will show the practical aspects of facial superimposition which could be a guide for enforcement officers in their pursuit for justice.

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[10] Simpson, K. *"Rex v Dobkin" The Baptist Church Cellar Murder.* .Medico-legal Review , Vol 11, 1943 pp 132-145.

The latter part of the study will then discuss the legal implications of such evidence. The level of acceptance of craniofacial superimposition evidence differs from country to country and some have considered it as a less reliable form of identification. To date, the question of relevancy and admissibility of the opinion evidence of the craniofacial superimposition expert has been discussed in the Malaysian courts in at least three cases and this research will delve into their merits. Thus the study will also discuss the following:-

1. The issue of relevancy of craniofacial superimposition evidence. The relevancy provision for such evidence which comes under section 45 of the Evidence Act 1950 will be discussed.
2. Can such opinion be considered, in law, to be on a point of science? This is knowing fully well that some may consider that this is an empirical science whilst others may argue that it is not accurate. The cases of *Chandrasekaran* , and *Leong Wing Kong,* would be relevant in coming to a conclusion.
3. The question of persons especially skilled in this field.
4. The admissibility of such expert's opinion. In this aspect the cases for and against its acceptance from other jurisdiction would be helpful for us to come to a possible persuasive conclusion in our local courts.

In conclusion this research will discuss the controversy over the reliability of craniofacial superimposition since it was first tendered as evidence in the court of law as some forensic scientists consider that this technique should not be used for definitive identification purposes. On the other hand others have endorsed the capabilities of superimposition as a method of reliable identification and a discussion will be made on several prerequisites that should be observed by a forensic investigator for a proper identification methodology. Finally the position of superimposition methods in Malaysia will be considered.

HISTORICAL BACKGROUND AND DEVELOPMENT

As has been discussed earlier, craniofacial superimposition is a method of comparing the characteristic features of a skull with a photograph of a person whose identity is known. As a technique to aid the personal identification of unknown human remains, it is not new.

It was originally carried out by using hand-drawn tracings and has since undergone changes from the earliest method of using viewing boxes, slide projector and overhead projectors to that of video technology and now to the incorporation of ***e-technology***[11].

The earliest works were artists' portraits and sculptured busts which were used for comparison to authenticate skulls of historical significance. Work in this field can be attributed to Hermann Welcker (1867) who analyzed measurements taken from a skull said to be that of Dante[12] (whose tomb was renovated in 1865 on the 600th anniversary of his birth). Welcker compared these measurements with a death mask[13] of the poet

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[11] Helmer, R. , Grunner, O. , Skull Identification by means of Super-projection using the Electronic Photocomposition Technique, Modified to the Animated Picture Difference Procedure. *J. Rechtsmedizin* (1977) 80 , pp:189-190.

[12] Dante Alighieri was a poet and spiritual writer who is considered to be one of the greatest of Italian poets. He was born in Florence, Italy, in 1265. http://justus.anglican.org/resources/bio/244.html , http://www.greatdante.net/life.htm

[13] Death masks were popular in the 19th century as a way of preserving a dead person's features and is a cast of the face of a dead person or a record of an important person's face for posterity. It is a mold taken of a person's face. A cast is made by covering the face with a layer of plaster. Two layers are usually applied to allow the plaster to harden and when both layers dry, the entire mold is removed from the face. Usually such casts have been made from a mold produced by placing gesso or plaster on the face. Such a mold can usually be of one piece, since the face is generally sufficiently flexible to enable removal of the hardened mold, as long as a release agent has been applied to the hair and skin.http://www.artlex.com/ArtLex/D.html

housed in Florence and concluded that the mask did indeed belong to Dante's skull.

Death mask of Dante[14]

He then continued this work with the skull of Kant[15] and compared it with a death mask of the philosopher. Findings by Welcker(1883) were that the comparisons were so striking that the match could have been found by picking from hundreds of different skulls and masks. But in subsequent comparisons of the supposed skull cast of Schiller[16] and two death masks in 1883 , Welcker doubted the authenticity of both the cast and the mask. In 1884 Welcker and Schaaffhausen combined their efforts in skull and portrait

[14] http://thanatos.net/deathmasks/picture.php?album=gallery&picture=21&lang=en

[15] Kant, Immanuel (1724-1804), German philosopher, considered by many the most influential thinker of modern times. http://encarta.msn.com/encyclopedia_761560445/Kant_Immanuel.html .

[16] Friedrich Schiller (1759 – 1805) was a foremost German dramatist. http://www.studiocleo.com/librarie/schiller/biography.html .

comparison to measure the accuracy of three profile portraits of Raphael[17] in relation to a known cast.

Work continued in 1895 with another anthropologist named W.His who took facial–tissue thickness measurements from 24 male and 4 female cadavers. These measurements were then used by him to construct a bust of Johann Sebastian Bach[18], producing an extremely lifelike resemblance.

Lander (1918) seems to be the first person to use a photograph as an ante mortem record for comparison with a skull. Her investigation, however, did not involve the superimposition of one image upon the other, and the only conclusion she reached was that *' It seems improbable that anyone examining the skull would postulate a type of face similar to that seen in the photograph'.*

In the early decades of the twentieth century, the English biometric school undertook a series of comparisons of the skulls said to be those of Jeremy Bentham[19], Sir Thomas Browne[20], Robert the Bruce[21], George Buchanan[22] , Lord Darnley[23] and Oliver

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17 Raphael (1483-1520), Italian Renaissance painter, considered one of the greatest and most popular artists of all time. http://encarta.msn.com/encyclopedia_761570572/Raphael_(painter).html

18 Bach, Johann Sebastian (1685-1750), German organist and composer of the baroque era, one of the greatest and most productive geniuses in the history of Western music. http://encarta.msn.com/encyclopedia_761563298/Bach_Johann_Sebastian.html

19 British gentleman, political activist, legal scholar, social philosopher, linguist, Jeremy Bentham is best known as the founder of British "utilitarianism" or "philosophical radicalism". http://cepa.newschool.edu/het/profiles/bentham.htm

20 Browne, Sir Thomas (1605-1682) Physician and author.
For superimposition work see; Tildesley, M.L., Sir Thomas Brown: His Skull, Portraits, and Ancestry. *Biometrika* (1923) Vol XV No:1.

21 King Robert the Bruce of Scotland. www.britannia.com/bios/robertbruce.html.

22 Buchanan , George. One of the most distinguished reformers, political and religious, of the sixteenth century, and the best Latin poet which modern Europe has produced

Cromwell[24] with relevant portraits, busts or death masks (Tildesley, 1923 ; Pearson, 1924 , 1926, 1928 ; Pearson and Morant, 1934) . The accuracy of these artistic representations was difficult to confirm, and the results were open to doubt. Despite the limitations they were able to show the authenticity of the skulls in question. Though various techniques were employed to make these comparisons, but where superimposition was used, it usually involved using a Coradi pantograph[25] to make an outline drawing of a photograph taken of the skull or head in an attitude representative of that in the portrait. This outline was then placed over a pencil tracing of the portrait and the coincidence of the outlines assessed.

It should be noted that in these early works no photographs were used as a superimposition onto the image of the skull as only death masks, portraits and pantographs were used.

PHOTOGRAPHIC SUPERIMPOSITION

The first documented use of photographic superimposition appears to have been by Pearson, Morant and Derry, who in 1934 demonstrated that tracings taken from the photographs of the head and macerated skull of an executed Egyptian criminal could be

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[23] Second husband of Queen Mary of Scots.

[24] Cromwell, Oliver (Lord Protector) (1599-1658), leader in the English Revolution (1640-1660) and the first commoner to rule England.

[25] A pantograph is a series of arms connected in a special manner such that they move in a fixed relationship to each other. One arm contains a small pointer whilst the other holds a drawing implement, and by moving the pointer over a diagram, a copy of the diagram is drawn on another piece of paper. By changing the positions of the arms in the linkage between the pointer arm and the drawing arm, the scale of the image can be changed.

superimposed to produce a good fit. They had compared a photograph of the executed criminal taken immediately after his execution with a photograph of the criminal's subsequently prepared skull.

Although Furuhata (1967) claims to have identified a man's skull by facial restoration and superimposition as early as 1925, it is accepted by experts that the most notable occasion when this method was used with considerable success was in ***'The Ruxton Case'*** where forensic superimposition work was done by Glaister and Brash (1937).

The Ruxton case unfolded on 29 Sept. 1935 with the discovery of the mutilated and dismembered bodies of two women in a ravine near Moffat, Scotland. The bodies were so badly mutilated that there were all in about 70 such bundles of decomposing human remains which were surgically dismembered and were infested with maggots. An examination of the recovered fragments revealed that considerable effort had been made by the killer to frustrate identification of the victims. Fingertips had been severed. Eyes, noses, lips and large portions of the skin of the faces and scalp as well as numerous teeth from the jaws were removed.

In the course of the investigation photographs of two missing persons were obtained. Because of the limited material available for identification, the investigators decided to attempt to compare the skulls of the victims with portrait photographs of the missing persons. They initially made life-sized enlargements of selected ante mortem photographs and full scale photographs of the two skulls. Salient features of each

photograph were outlined on linen tracing paper and then compared with the skull image by superimposition. When this confirmed that it was possible to recognize similarities between the skulls and the photographs, direct photographic superimposition was undertaken. A positive image of the portrait and a negative image of the skull were made; these were then superimposed on X-ray film and positive prints produced from them. Investigations revealed that a remarkable correspondence was found between features on the skulls and features in the photographs.

During the subsequent trial of the killer in the Ruxton case, the forensic experts , in an attempt to verify the accuracy of the superimposition technique , photographed the head of an anatomical cadaver, removed the soft tissues from the skull , which was then photographed, and compared with the photographs of the face of the cadaver. The results were reported as 'being reasonably accurate'. Nevertheless superimposition in the Ruxton case was intended not for the purpose of definitive identification but rather as corroboration of other evidence.

An unusual case from Yogoslavia was undertaken in 1976 by Palmovic where confronted by the need for religious purposes to provide positive identification of the skeletal remains of a nun who had been buried in a communal grave (Brown, 1983). Palmovic carried out a series of superimpositions of six skulls recovered from the grave over a photograph of the nun and, was successful in selecting the correct skull. Lesions found in the spine of the deceased corresponded with known medical history of the nun and provided supportive evidence of the identification.

Many subsequent investigators have modified the technique used by Glaister and Brash in the '***Ruxton Case***' in various ways, usually by employing different camera systems.

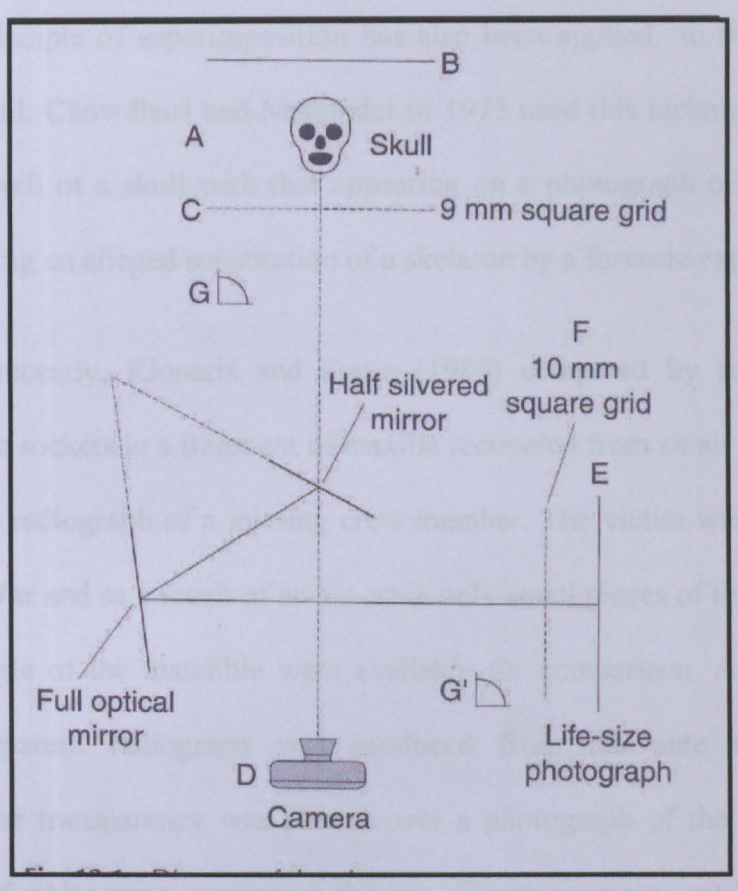
For example in another case a variation was envisaged by Gordon and Drennan (1948) where to facilitate the superimposition, an outline drawing of a life-sized enlargement of the ante mortem photograph was compared with a projection drawing of the reconstructed skull, which had been set in the same orientation as the face in the photograph. In this case on the 25th April 1946 the remains of a severely burnt body and a car were found by the road near Durban, South Africa. The body was so badly charred that it could not be identified by normal means of identification. However it was presumed that the remains were those of Mr. Michael Wolkersdorfer. The age, sex, stature and race determination was done by examining the bone development and characteristics whilst the skull was used to provide positive identification using the method by Glaister and Brash. The superimposition showed good anatomical correspondence although the mandible was somewhat displaced by the burning of the chin and its adjoining muscles.

Cocks (1970) used a method of superimposition to quantify identification of the fragmented skull of a murder victim. A photograph was taken of the reconstructed skull and compared was a passport photograph of the suspected victim. A system of triangulation was used to demonstrate the degree of correspondence between the skull and the photograph. Corresponding landmarks were determined on the photographs of the skull and the suspected victim. These points were joined to form a series of triangles. The

pattern of the triangles from the photograph of the skull was traced on to a transparency, and this was superimposed upon the portrait photograph to compare the patterns. Coincidence of these patterns indicated a match.

Thomas *et al* (1986) superimposed a projected image upon a photographic print to achieve a comparison.. They had enlarged a passport photograph of the suspected victim to life size and fixed this to a convenient vertical surface. A transparency of the skull ,photographed in a similar orientation was then projected on to this enlargement. The projector was placed at a distance that produced a projected life sized image of the skull.

It has been stated by Taylor (1998) that the most important contribution to craniofacial photo superimposition was devised by Furue, where this system has been used by the United States Armed Forces Central Identification Laboratory in Hawaii since 1971. This method recognized the critical significance of photographic perspective to the accuracy of the comparison of both images. This perspective depended solely on the camera-to-subject distance, and Furue devised an ingenious system to determine the camera-to-subject distance of the person in the photograph and simultaneously replicate the conditions under which the photographs were taken. This system enables the skull to be aligned against the photograph before an image is recorded and takes into account the perspective incorporated in the ante mortem photograph.



Craniofacial photo superimposition devised by Furue[26]

[26] The skull to be identified is mounted on an adjustable stand, placed in front of a backdrop sheet of contrasting colored cardboard (B) at one end of a bench. A 30cm grid of 9mm squares constructed of fine wire mounted on a clear plexiglass sheet (C) is positioned in front of the skull. A modified (aerial image focusing screen) camera is set at the opposite end of the bench. To the right of the camera, a life-sized enlargement of the ante-mortem photograph (E) is placed directly behind a grid of 10mm squares (F) constructed from fine wire mounted on clear plexiglass. Two mirrors, one a full optical mirror and the other a half-silvered mirror, are placed at appropriate angles to the left and in front of the camera. The mirrors are arranged such that the full mirror reflected the image of the photograph upon the half-silvered mirror, which reflected it along the central axis of the camera lens. Two 200 W lamps (G,G') illuminated the skull and the photograph independently , and were strategically positioned between the skull and the camera. The image of the skull is transmitted through the half-silvered mirror to the camera and the image of the ante mortem photograph is reflected from the optical mirror and the half-silvered mirror to the camera lens, so that the images of both the skull and portrait could be seen through the viewfinder of the camera. Each image can be intensified or reduced by alteration of the distances of the lamps from the skull and photograph. The distances between the skull, grids, mirrors, photograph and camera is determined according to the distance from which the ante mortem photograph was taken. These distances are critical factors. When the distances are correct, the two grids appear precisely superimposed, indicating the appropriate degree of magnification and exact reproduction of the perspective incorporated in the ante mortem photograph. After correct alignment is obtained, an image of the skull is recorded on the camera film following removal of the half-mirror. A negative transparency of the ante mortem portrait is then overlaid onto a positive print of the skull. A sheet of white film is moved between the transparency and the print to highlight the comparison.

The principle of superimposition has also been applied to the identification of portions of skull. Chowdhuri and Majumder in 1975 used this technique to compare the upper dental arch of a skull with that appearing on a photograph of a skull to settle a dispute involving an alleged substitution of a skeleton by a forensic expert.

More recently, Klonaris and Furue (1980) compared by superimposition the pattern of tooth sockets in a fragment of maxilla recovered from an air crash, with an ante mortem dental radiograph of a missing crew member. The victim was a pilot serving in the Vietnam War and as a result of an air crash only small pieces of the right maxilla, the ramus and angle of the mandible were available for comparison. An enlarged reverse contrast transparent radiograph was produced from the ante mortem periapical radiograph. The transparency was placed over a photograph of the maxillary ragment with a piece of white paper separating the two. Comparison was made between the two images by movement of the paper between them until a match was achieved to a point where the identity was achieved.

Craniofacial superimposition as a mode of identification was used later in the identification of the worlds most notorious and wanted war criminal. Dr. *Josef Mengele* was a Nazi doctor who performed experiments on prisoners in Auschwitz who were condemned in a murderously sadistic way and he actively participated in the selection of people to be sent to the gas chambers. It was during his 21-month stay at Auschwitz that Dr. Mengele achieved infamy, gaining the nickname "Angel of Death." When rail-cars filled with prisoners arrived in Auschwitz II Birkenau, along with other doctors Mengele would frequently be waiting on the platform to select who amongst them would be

retained for work and experimentation and the remaining would be sent immediately to the gas chambers. Despite international efforts to track him down, he was never apprehended and lived for 35 years hiding under various aliases. He was not tracked down by Nazi hunters until 1985, when his body was found and identified after a combined effort of US, German and South-American authorities.

Josef Mengele[27]

Initial autopsy findings corresponded well with information available, but they were not conclusive in providing a personal identification on the world's most wanted criminal. As such Helmer (1987) and Teixeira (1985) had conducted superimposition techniques to verify the identity of the skeleton. Venkiteswaran (2001) in her paper

[27] http://www.candles-museum.com/mengele.htm

summarized the effort by Helmer as follows:- The skull was marked in the photographic plane at the contour giving areas with marks of soft tissue corresponding to the respective age and type of body structure. The comparison had resulted in the complete conformity concerning all recognizable proportions of the head, face, eyes, nose and mouth. The outline of the soft tissue layer model on the skull was congruent with the facial contours lying in the photographic plane. Special features in the bone morphology, for example, the very prominent supraorbital tori and the exostosis at the back part of the head were easily detectable and found to have formed the configuration of the skull at the matching regions. The findings by Helmer stated that there was no room for doubt that the exhumed skeletal remains were indeed those of Josef Mengele. This identification was later verified and deemed correct by DNA tests done on his bones in 1992.

Notwithstanding its value in craniofacial superimposition identification, this method of photographic superimpositions has some problems which are associated with it; refer to work by Phillips *et al*(1984), and McKenna and Phil (1988) . Similarly Nickerson *et* al (1991) has stated some of them as follows:-:-

1. ***angular positioning***: the skull and facial regions in the photographs must have a reasonably equivalent spatial positioning through six degrees of freedom.
2. ***scaling factors*** : similarly the areas of interest must be differentially scaled so that they appear equivalently close to the observer.

3. ***camera lens incongruities*** : different camera lens focal lengths can easily distort the contours of regions of high curvature; and
4. ***poor initial photography*** : poor camera or film characteristics can easily lead to noisy or grainy exposures, overexposure or underexposure, blurring, and other photographic enigmas.

As such the technique of cranio-facial video superimposition had been developed to overcome the protracted time involved with still photography superimposition, coupled with the above problems stated.

VIDEO SUPERIMPOSITION

In 1977 Helmer and Gruner, and Brown *et al* (1978) in Australia, independently, introduced a significant modification to the photographic technique of craniofacial superimposition. They substituted video cameras for still cameras. They thus managed to remove some of the problems face by still-photography superimpositions. A plan of the system used by Brown *et al* is shown below.

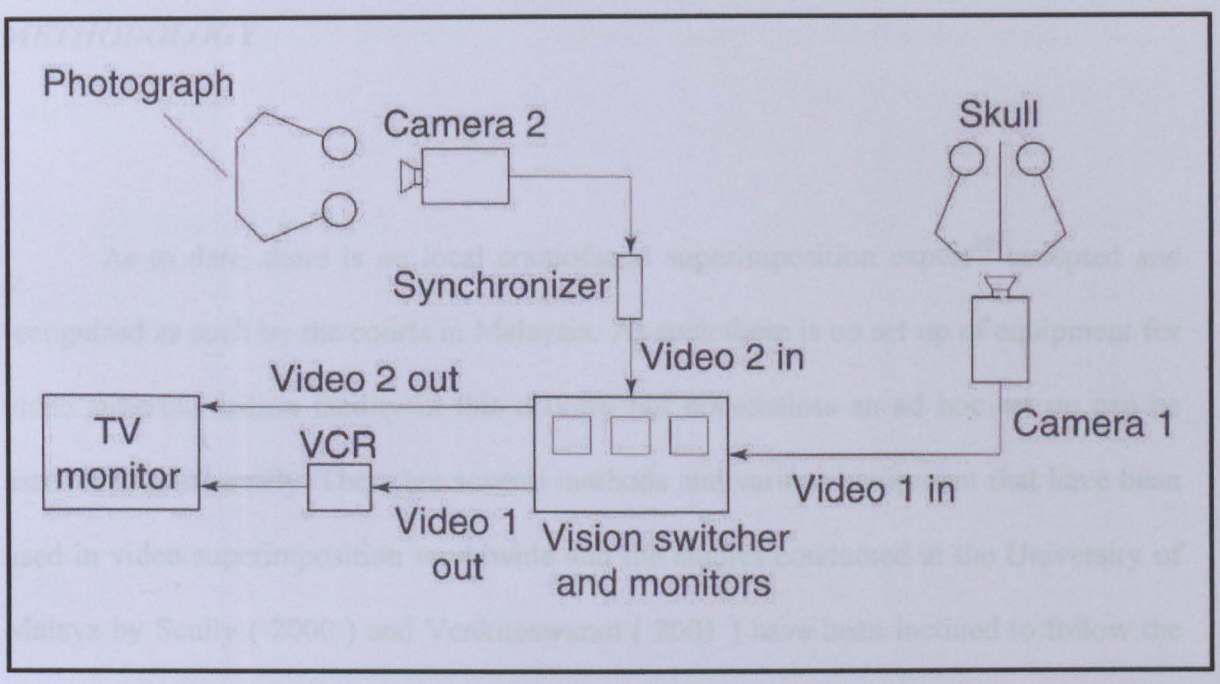


Diagram of the video superimposition system[28]

The original system developed by Brown *et al*, utilizing video cameras were later replaced by semiprofessional Ikegami cameras, with a noticeable increase in image quality. New generation charged couple device (CCD) cameras offer a further advantage over these older tube cameras in that there is no loss of image quality as the camera ages. Tube cameras tend to fade with unpredictable impact on the transmitted image.

[28] Two video cameras are employed, one focused on the ante mortem photograph and the other on the skull. Each camera transmits its image to separate monitors , and both image signals are then fed through a special-effects generator that permits the display of both images superimposed on a third monitor. The immediate display of the superimposed images enables the operator to adjust the orientation of the skull with greater accuracy to correspond with the position of the face in the photograph. Zoom lens fitted to the video cameras permit instant adjustment of magnification of each image to a common scale. The special-effects generator is employed to produce a variety of combinations of the superimposed images displayed on the monitor, permitting detailed comparisons of significant facial features.

As to date, there is no local craniofacial superimposition expert[29] accepted and recognized as such by the courts in Malaysia. As such there is no set up of equipment for video superimposition facility in this country but nonetheless an ad hoc set up can be assembled quite easily. There are several methods and various equipment that have been used in video superimposition worldwide and the studies conducted at the University of Malaya by Scully (2000) and Venkiteswaran (2001) have been inclined to follow the procedure and method laid down by Taylor and Brown from the Forensic Odontology Unit, University of Adelaide, Australia. This paper will outline the equipment as set up in two Malaysian papers.

Equipment

Video Camera

Two color video cameras are employed, one focused on the ante mortem photograph and the other the skull. The cameras are mounted on a permanent horizontal steel track which has a calibrated aluminum rail fixed to it. A mobile dolly is used to carry the camera and can be clamped at any point along the track. The track carrying the

[29] The expert must, as a preliminary issue, give evidence of his qualifications to enable the court to consider his opinion evidence. See the decision by Hashim J. in Wong Chop Saow v Public Prosecutor (1965) 1 MLJ 247 where he stated *"....suggest that to avoid confusion the expert witness should give his evidence as follows. He should first state his qualifications as an expert. He should then state that he has given evidence as an expert in such cases and that his evidence has been accepted by the courts."*

camera which focuses on the skull is 5 meters in length whilst the second track is 2.5 meters in length.

Electronic Equipment

Each camera transmits its image to separate monitors, one bearing the image of the skull and the other the photograph. The superimposed image would appear on the third screen. It would be seen as the life sized photograph of the person and therein appears the skull. This is obtained when both image signals are fed through a special effects generator which permits the mixing of images. The intensity of the skull image can be altered and this allows fading of one image into another, wiping of segments of one image over the other, and reversal to negative form of one image if required to achieve greater contrast between the two images.

Photographic Mount

The ante mortem photograph is mounted using magnetic strips, onto a sheet steel surfaced board measuring 425 x 460 x 20mm .The board is fitted to a simple adjustable bracket the permits alignment with the image plane of the video camera. A plane mirror marked on its surface with a central cross line is placed at the centre of the mounting board in such a manner that the centre of the cross is at the level of the central ray of the camera lens.

Skull Mounting

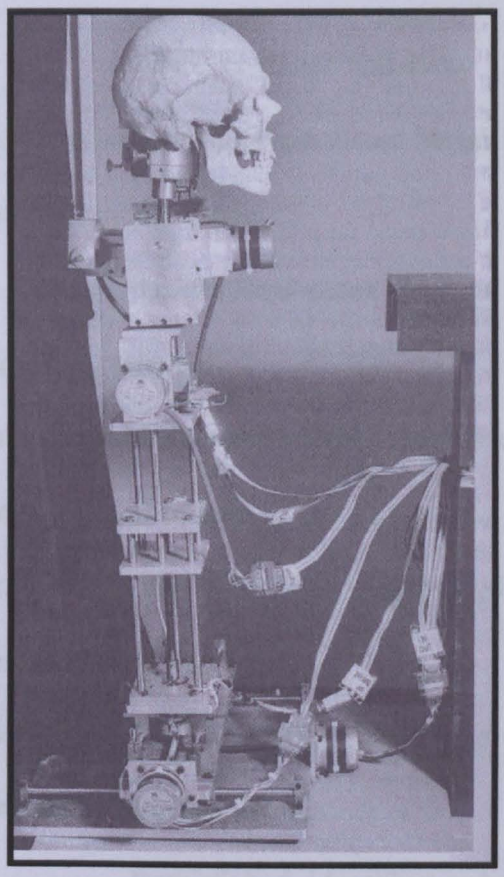
Correct mounting and orientation of the skull is critical as was shown by Chandra Sekharan (1973) for a meaningful comparison by superimposition. The system used is that developed by Taylor and Brown which would simulate the natural movement of the head and be capable of reenactment via computer control. This skull mounting and orientation device (SMOD)[30] would permit controlled, reproducible movement of the skull in six degrees of freedom (three perpendicular planes x, y, z and three axes of rotation). The device is approximately 800 x 500 x 450mm and is installed at the end of camera tract one. All movements are performed by steeper motors controlled remotely from the computer terminal. Precision adjustments could be made in 1mm steps and 1 degree segments, and the incremental data are stored in the computer for future reference.

A standardized method of clamping the skull is essential in its placement and orientation. The foramen magnum is the most convenient site for fixation of the skull and it also proved to be a suitable reference for continued use. The mounting device consists of a metal plate which is fitted with 3 curved jaws. The larger anterior jaw (30mm in height) is fixed to the plate while the two smaller posterior jaws (10mm in height) are free to move in two slots and are adjustable. The jaws are placed within the foramen magnum to provide 3 point fixation of the base of the skull against the plate.

A removable separating plate is keyed to the mounting plate and this acts as the base for the softened dental impression compound into which the skull base is pressed. This functions as a removable customized but solid and reusable anatomical mount for

[30] For an example of another such device see article; Adachi, K. , Ohtsuki, F. , Hattori, M. , Development of a Rotatable Skull Holder " Rotacraniophor I " *J. Anthrop. Soc. Nippon* (1989) 97 (3) pp: 393-405.

each skull. The skull is positioned so that it rests on the Frankfort horizontal plane. It provides a reproducible starting position since the SMOD restores the axes to a standard reference position.



Skull mounting and orientation device (SMOD)

The superimposition technique has been used as a means of identification in both criminal and civil cases in many parts of the world. These include the following:-

1. U.S.A. - where Haglund and Reay (1991) had assisted in the identification of the Green River Serial Murder victims using superimposition techniques..
2. U.K. - the criminal cases of *R v Clarke*[31] and *R v Hookway*[32] are relevant
3. Germany - Hagemeier (1979) identified a skull by electronic superimposition of images.
4. Switzerland - Iten (1986) identified a skull by video superimposition.
5. Australia - Superimposition work was done on photographs and portraits by Bastiaan *et al* .
6. Peru - Basauri had identified a body by both forensic odontology and superimposition of photographs.
7. Japan - where Yoshino *et al* (1989) had identified an infant skull by superimposition.

[31] The Times 26 Dec 1994
[32] (1999) Crim LR 750

8. India - Reddy (1973) had assisted in the identification of dismembered parts and the medico legal aspects of the Nagaraju case using superimposition.

9. Singapore - Loh and Chao (1989) had used interpupil distance in extrapolating the magnification factor in a superimposition technique used in solving a criminal case.

10. Indonesia - Sahelangi *et al* (1996) had used superimposition in a skeleton identification.

This technique has been widely used in South East Asia and Malaysia , with most of the credit going to the Japanese. In fact all the cases of craniofacial superimposition investigated locally were conducted by Dr. Masatsugu Hashimoto of the Tokyo Dental College, Japan. There were 8 cases of superimposition conducted by the Malaysian police authorities, of which three have reached the courts of law. This paper will investigate into the cases in depth individually as follows: -

Case No: 1

Travers Police Report 1973 / 88[33]

This was indeed the first case in Malaysia where craniofacial superimposition was used as a method of identification. The case came to light when an opposition member of parliament had stated in the Dewan Rakyat (Malaysian House of Commons) that one of

[33] Brickfields Investigation Paper No: 1869 / 88 (Travers Rpt: 1973 / 88). Investigation Officer : Insp. Mohamad b. Puteh

the member's of the house was involved in a 'blue film'. This caused an uproar in the session and the general public was astounded with disbelief.

Police investigations revealed that the above allegations had a link to a robbery and theft in the dwelling of the Deputy Speaker of the House, which was reported earlier. Amongst the items robbed and stolen were some personal documents, photographs and some video tapes belonging to him. It was the contents of these tapes and their subsequent distribution by the culprits that was a cause of concern to the victim. The tapes were allegedly showing the sexual exploits of the said Member of Parliament.

The question for the investigation team was the identity of the person in the video tape. The tapes and the photographs[34] of the alleged MP were given to Prof. Masatsugu Hashimoto, Department of Forensic Odontology, Tokyo Dental College, Japan. The findings by the expert was that the person in the tape was undoubtedly the suspected MP[35].

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[34] Photographs of the MP were obtained from Maika Holdings Bhd. and also further photographs were taken whilst he was in court. These were compared with that in the video tape.

[35]The Court of Appeal accepted the finding of fact of identity of the person in the tape to be that of the Member of Parliament..

Case No 2:

Selama Rpt: 263/91

Complainant : Mary Anne a/p Ariokadass @ Siti Khatijah Abdullah
I/C no: 373497 , Date of Birth : 6/9/60 , Balik Pulau,
Penang.

On the 17. 4. 91 complainant, the wife of Detective Constable Kanaperan a/l Ramadass @Mohd Amin b.Abdullah who was attached as a Special Branch Officer at the Selama Police District, lodged a police report at Balai Polis Jalan Bandar, Kuala Lumpur . This report was later classified as Selama Police Report 263/91[36]. Complainant in her police report stated that she was raped, forced to perform unnatural sexual acts (orgies) and which were recorded on video, extorted and forced to prostitute herself after being abducted by her captor since 10.6.84. Police investigations were conducted and investigations classified under sections 376[37], 377[38] and 385[39] of the Penal Code.

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[36] Soon after lodging the police report complainant and her husband had gone to the press (New Straits Times) and made public their report. This caused an uproar by the public and mistrust against the police. See newspaper cuttings :-
NST dated 20/4/91 *" I was raped and blackmailed, says detective's wife "*
NST dated 21/4/91 *" Bukit Aman probes sex allegation"*,
NST dated 22/4/91 *"Women want independent inquiry"*,
NST dated 25/4/91 *"Rape probe to be expediated"*,
NST dated 27/4/91 *" Cop's wife seeks women's group protection"*,
NST dated 20/7/91 *"Man surrenders video tape"*.

[37] Section 376 Penal Code: Punishment for Rape *"Whoever commits rape shall be punished with imprisonment for a term of not less than five years and not more than twenty years, and shall also be liable to whipping."*

[38] Section 377C Penal Code: Committing carnal intercourse against the order of nature without consent: *Whoever voluntarily commits carnal intercourse against the order of nature on another person without the consent, or against the will, of the person, or by putting the other person in fear of death or hurt to the person or any other person, shall be punished with imprisonment for a term of not less than five years and not more than twenty years, and shall also be liable to whipping."*

[39] Section 385 Penal Code: Putting person in fear of injury in order to commit extortion: *" Whoever, in order to commit extortion , puts any person in fear, or attempts to put any person in fear of any injury,*

Amongst her allegations were:-

- She was raped and subsequently nude photographs taken of her by two police personnel who were also attached at the same police headquarters.
- Further rapes and orgies were held against her will by 11 other police personnel including the Officer in Charge of the Police District (OCPD) of Selama. Video recording was done during these incidences. She also claimed that her five children were fathered as a result of these orgies and that her husband was not the biological father of the children.
- She was extorted of money, in lieu of disclosing of the obscene photographs, by another police officer.
- She was made to prostitute herself by yet another police office.

With the media playing on the police reports, the general public was dismayed and demonstrations were held by political and human rights parties[40] against the alleged actions by the police. With the picture painted there was great mistrust on the police.

Police investigations were conducted by the Sexual Offences Unit, Criminal Investigations Department, Bukit Aman and 183 statements recorded. Blood samples were taken from the complainant, her husband, and her children. Also taken were blood samples of the police personnel said to be involved. These were sent for DNA profiling

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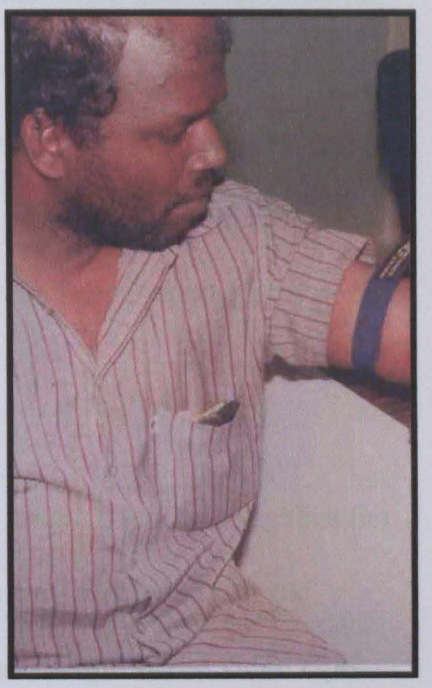
shall be punished with imprisonment for a term which may extend to seven years, or with fine, or whipping or with any two of such punishment."

[40] On the 17/11/91 a group of people gathered and demonstrated in front of Jalan Bandar Police Station. Amongst the placards held were :- *"Bersihkan Pasukan Bersenjata daripada Penjenayah ", " The Police Force must have no criminals", "Rakyat Salah Polis Tangkap, Polis Salah Siapa Tangkap", "Open Inquiry Now".*

which later verified that the children were indeed fathered by the complainant's husband and not as alleged i.e. by the police personnel.

Mary Anne a/p Ariokadass



Detective Constable
Kanaperan a/l Ramadas

The next question was regarding the video tape allegedly showing the victim being raped by the police officers. This tape was sent to Prof.Masatsugu Hashimoto, Department of Forensic Odontology, Tokyo Dental College, Japan together with photograph of the complainant. It is interesting to note that superimposition was done on the following[41]:-

[41] For a full report refer to Appendix I at page 85

a) Comparison of the standing position.

Similarity of body character such as height and proportion between the two images was done. In this method, the most important thing was to reconstruct the condition which the picture was taken, and in this case the picture edited from the phonographic tape was taken from the lower level, though the alleged victim was taken from a bit higher position. Though a small parallax error was observed but it was not critical. The finding was that the alleged victim was taller than the girl in the phonographic tape.

b) Comparison of the right foot.

From the comparison of the two images, the length of each toe against the total length of the foot was different. Thus it was concluded that the foot size of the alleged victim was bigger than the girl in the video tape.

c) Facial profile.

The width of the face i.e. the distance between the right and left zygomatic arch was different in the two images. Further the anatomical position of the right and left orbits, nose and mouth was also different in the two images.

d) Superimposition of the left hand fingers.

It was found that the nail bed shape of the forth finger was dissimilar in the two images. Further the position of the tip of the second finger was higher in the alleged victim than the girl in the phonographic video.

Thus superimposition investigations showed that the alleged victim and the girl in the phonographic video were not the same person.

With the above police and forensic investigations, the allegations against the police were found to be untrue and as such the complainant and her husband were charged for making a false report[42] and defamation[43] against the police.

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[42] Section 182 Penal Code: False information with intent to cause a public servant to use lawful power to the injury of another person." *Whoever gives to any public servant any information orally or in writing which he knows or believes to be false, intending thereby to cause, or knowing it to be likely that he will thereby cause, such public servant to use the lawful power of such public servant to the injury or annoyance of any person, ...shall be punished with imprisonment for a term which may extend to six months, or with fine which may extend to two thousand ringgit, or with both."*

[43] Section 500 Penal Code. Punishment for defamation:" *Whoever defames another shall be punished with imprisonment for a term which may extend to two years, or with fine, or with both."*

Cases No: 3 , 4 , 5 , and 6.

Pulau Tikus Report 13165 / 92 , Pulau Tikus Report 13166 / 92 , Pulau Tikus Report 13234 / 92 and Pulau Tikus Report 2868 / 93.

The above cases are interlinked as they are gangland style slayings linked to the Siew Sam Ong[44] triad which was in operation in the northern region of Peninsular Malaysia. A task force was set up by the then Director of Criminal Investigations Department to combat and solve these cases. The bodies / skeletal remains were recovered as a result of the arrest of gang members who were subsequently interrogated.

Pulau Tikus Report 13165 / 92.

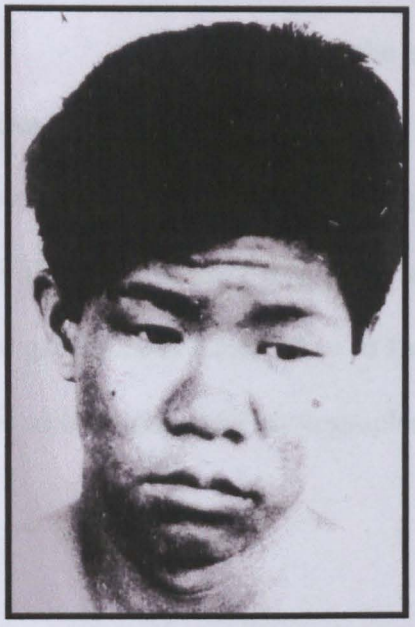
Interrogation on one of the suspected gang members arrested led to the recovery of a shallow grave at a hill at Mount Erskine Road, Penang on the 30 / 12 / 92. Several bones and the skull were recovered.

Unearthing of the grave with the recovery of the skull

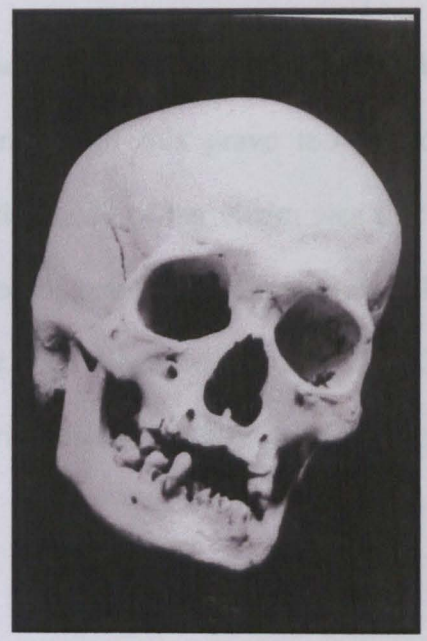
[44] Which literally means " Three Little Gods."

Investigations reveal that at about 2300hrs, sometime during the end of 1991, the victim was lured to the hilltop where he was subsequently stabbed and killed. His body was then removed of clothing, identity papers and buried in the shallow grave dug by several gang members at the scene. The grave was only discovered about a year later – thus for the skeletonized stage of decomposition. The investigation officer was thus posed with the question of ascertaining the identity of the deceased in the grave.

Prof. Masatsugu Hashimoto then examined the skeletal remains with special emphasis on the skull[45]. A photograph of the skull was taken and it was compared with the ante mortem photograph of the suspected victim.



Ante mortem photograph of suspected victim[46]



Photograph of recovered skull

[45] For a full report refer to Appendix II at page 87.
[46] George Town Investigation Paper: 7110 / 92.

Superimposition of the ante mortem photograph was done with the photograph of the skull, but it was found that the two photographs were taken under different conditions. Thus it was stated by Prof Masatsugu that :-*" It was impossible to get the conclusion by the superimposition of these two photographs. I would recommend to take the photograph of the skull under the same conditions which ante mortem photograph was taken and then superimpose again."* Thus the identity of the suspected victim could not be verified by superimposition. Nevertheless it is a good lesson in that the importance synchronizing the conditions of photographs (i.e. ante mortem and skull) is noted.

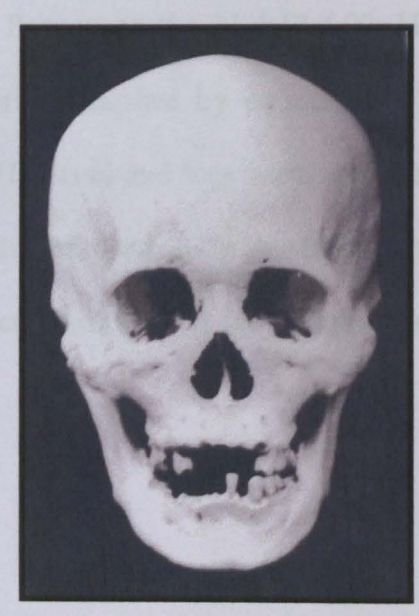
Pulau Tikus Report 13166 / 92

Interrogation of the same gang member led police to another unmarked shallow grave at Mount Erskine, Penang. The contents of this grave too revealed skeletonized remains. The circumstances leading to the death of the victim was that he was killed sometime in late 1991 as he was suspected of being a police informer. The above gang member led police to the site of the grave. The alleged victim was identified by his nick- name and a photograph obtained for superimposition by the forensic expert.

Photograph of the grave showing the recovery of skull [47]

The issue of identity of the remains of the victim in the grave was then carried out by Prof. Masatsugu who then compared the photographs of the skull to that of the alleged victim[48].

Ante mortem photograph of suspected victim



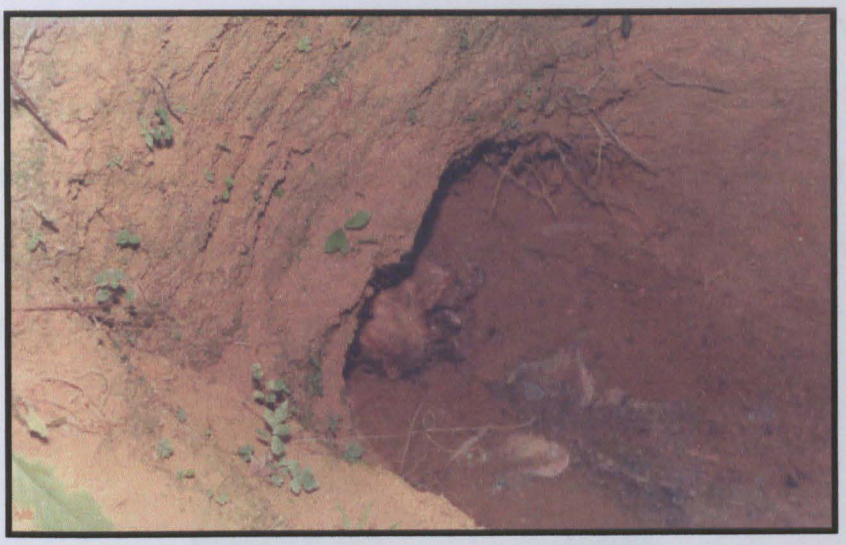
Photograph of skull.

[47] George Town Investigation Paper 7111 / 92.
[48] For a full report refer to Appendix III at page 94.

The photograph of the skull and that of the alleged victim were superimposed. It was observed that the anatomical position of each part between the skull and the face was superimposed well except for the zygomatic bone of the right side. He explained the difference due to the fact that the photographs were taken under slightly different conditions and stated that if the photograph of the skull had been taken at the same conditions as that of the ante mortem photograph it would have been possible to have the exact corresponding image. It was thus concluded that there was a very high possibility that the skull belonged to that of the alleged victim.

Pulau Tikus Report 13234 / 92.

Based on the information given a gang member, a police team was dispatched to Tanah Perkuburan Cina Kwangtung, Mount Erskine, Penang on the 31 / 12 / 92. Here another grave was shown and which was subsequently unearthed by police. In it the skeletal remains of an unidentified man were found. His hand and legs were apparently bound by nylon rope as the skeletal remains of the victim showed so. In this instance the informer could not disclose the identity of the suspected victim and the circumstances surrounding his death.



A shallow grave showing the skeletal remains[49]

A skull as it was recovered from the grave.

As there was no known suspected victim in this case the forensic expert in this case could only state the craniofacial characteristics of the victim, which could in a way

[49] George Town Investigation Paper 7112 / 92.

assist the police in future identification. It was found[50] that from the index values of the skull, the victim could be classified as having a rounded and high skull. In the same manner, the face was classified as narrow and clear-cut and, the nose seemed to be broad. An examination of the other skeletal remains further showed that the victim was a Mongoloid male, between 30 to 40 years and was about 171cm in height.

Photograph of victim's skull

Pulau Tikus Report 2868 / 93.

Again on information received on the 10 / 3 / 93 a police party was led to an unmarked grave at Tanah Perkuburan Cina Kwangtung, Mount Erskine, Penang. Here the shallow grave revealed skeletal remains of a victim who was murdered as the skeletal

[50] Refer to Appendix IV at page 102.

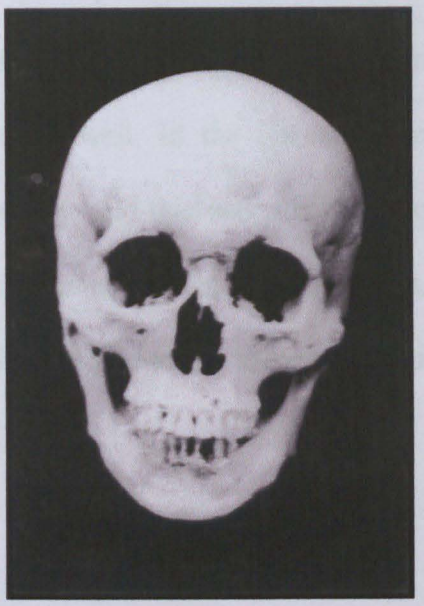
remains showed that the victim was tied by nylon ropes. Victim was apparently killed due to internal gang conflicts.

Photograph of grave showing the skeletal remains. Note the nylon ropes used.[51]

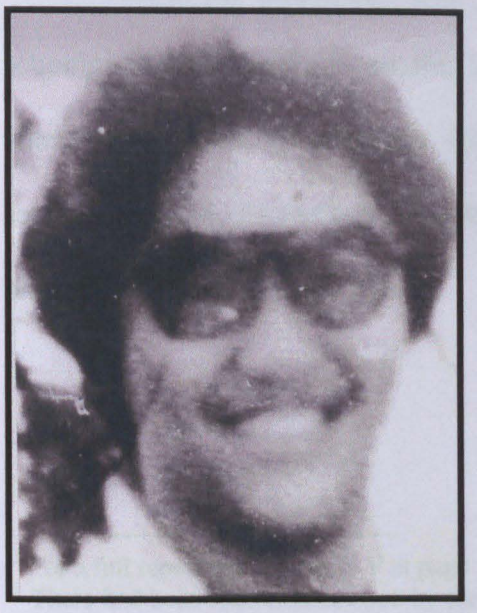
Photograph of skull at grave site.

[51] George Town Investigation Paper 1513 / 93

As the informer could give the nick-name of the suspected victim, ante mortem photographs were obtained to assist the forensic expert. Prof. Masatsugu then compared these with the photographs of the skull.



Photograph of skull of suspected victim



Ante mortem photographs of suspected victim used in superimposition.

From the photographs it was observed that the suspected victim had a prominent lower jaw and comparatively narrow nose. These findings[52] corresponded with the characteristics obtained from the skull. When the photograph of the skull and the ante mortem photograph were superimposed, it was observed that in the vertical axis, positional relationship of each part (i.e. eyebrow, eye, nose, mouth and chin) between the skull and the face corresponded well. In the horizontal axis, however, its positional relationship did not match exactly, and this was attributed to the slight difference of the rotation angle of the skull when it was taken. Nevertheless, it was concluded that on a very high probability the skull belonged to the suspected victim.

Case No: 7

Bau Police Report 153 / 93:

This is the infamous[53] Bau (near Kuching, Sarawak) case where a 18 year old schoolgirl was beheaded on the 16th March.1993 . Police investigations commenced when on the 16/3/93 at about 1830hrs the family members of the deceased began searching for her as she had not returned from school, and had found her headless body about 150meters from her house.

[52] For a full report see Appendix V at page 109.

[53] There had been sensationalization by the press which had generated a lot of public interest pertaining to the existence of head hunters securing the head for ritualistic purposes. This caused fear and despondency amongst the general public within the state of Sarawak and especially those in Bau District.

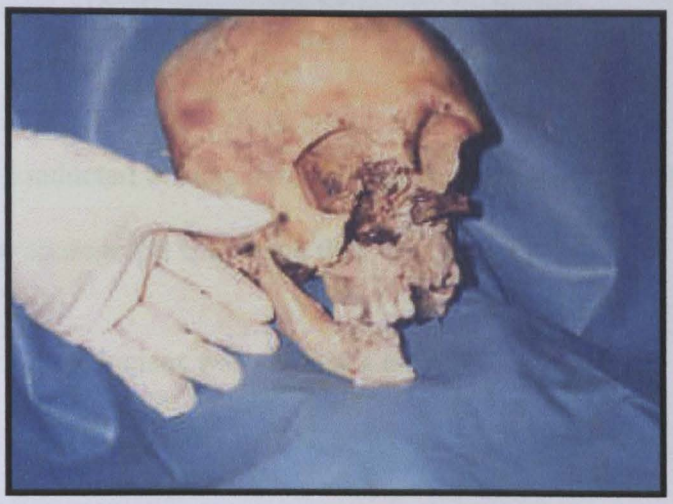
Photograph of the victim at the scene of crime[54].

Investigations revealed that the incident of murder occurred between 0530hrs and 0630hrs on the 16/3/93 while deceased was walking alone on her way to the main road to catch a bus to school. It was revealed that the suspect in this case, who was subsequently arrested, was walking along the same path that morning when he came across the victim. He had overpowered her and subsequently slit her throat twice. The victim was sexually accosted and then beheaded.

[54] Bau Investigation Paper No: 17/93.

Photograph of victim at the mortuary showing her decapitated body.

The headless body, still in full school uniform, was left in the bushes whilst the head was taken by the suspect to another location where he had systematically removed her facial skin, brains, and all other tissues until only the skull remained. When the suspect was arrested he had led police to the recovery of the skull which he had then hidden behind a bush not far from his house.



Photograph of the skull taken 3 days after the incident

Though there were other evidences linking the accused to the crime[55] one of the questions for the investigation team was the link between the skull and the headless body of the school girl. Coincidently, Prof.Masatsugu Hashimoto, was in Kuala Lumpur at that time and his services were called upon[56]. He examined the skull on the 23/3/93 at the Kuching Mortuary and took the necessary measurements and photographs. On his return to Japan he compared these to the ante mortem photographs of the deceased.

Ante mortem photographs of victim

He initially conducted a comparison of the dental similarity between the skull and the victim as per the photograph and found that:-

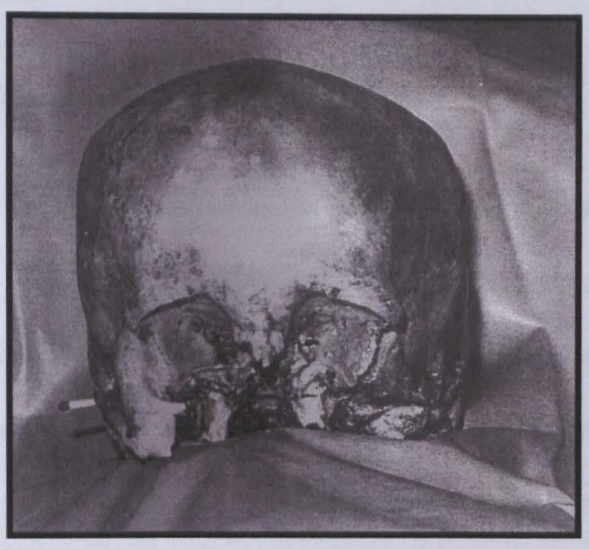
1. Her lateral incisor was slightly slanted.

[55] On the 11.4.97 the High Court of Kuching, Sarawak found the accused guilty of murder , an offence punishable under section 302 of the Penal Code, and sentenced him to death by hanging

[56] For a full report refer to Appendix VI at page 117.

2. The space between the upper left lateral incisor and canine was observed. Further the last tooth of the left side observed in the photograph was morphologically a first molar, and as such there was not enough space for two premolars.

These features were exactly the same as the features obtained from the mandible bone of the skull. A superimposition of the oral region further showed the size of each corresponding tooth and their positional relation were also exactly superimposed. As the frequency of a person with these same dental conditions and features seemed to be very few and almost zero, he therefore concluded that the skull belonged to the girl in the photograph.



Picture of skull used in superimposition

Close up of picture of victim

He then compared the anthropological characteristics of the skull with the photograph. Craniofacial superimposition method was applied to examine the features of the forehead and the anatomical relationship between the skull and the face of the suspected victim. Though a small mismatch was observed, he explained this as a small difference of rotation angle and fracture of the left temporal bone. Nevertheless vertical positional relationship between the anatomical parts of the skull and corresponding parts on the face (i.e. top of head, eyebrows, eyes, nose and ears) corresponded well. Based on the readings, it was concluded that the skull belonged to the suspected victim. The evidence of Prof. Masatsugu was accepted by the High Court of Kuching, Sarawak during the subsequent trial of the murderer.

Case No:8

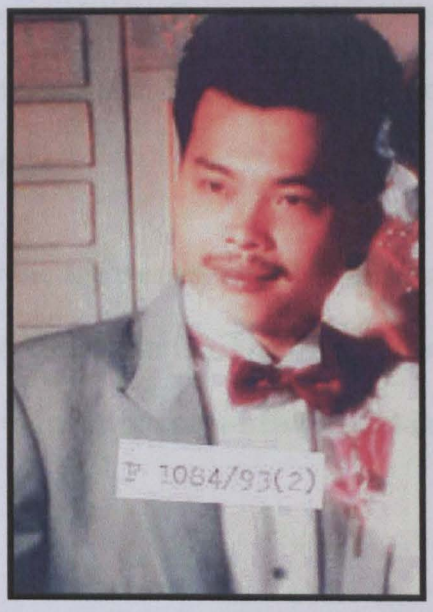
Kijal Report 565 / 93

This is the sequel to the infamous 'Mona Fandi'[57] case which shocked the whole nation. With the arrest of the suspects in the earlier case and their subsequent questioning, they led police to the site where they had buried two of their victims. The victims, who had been staying with the assailants for more than three months, were a newly wed couple whose 5 month old child had been killed earlier by the group. The victims were

[57] This is the case of the murder of State Assemblyman YB Dato. Hj. Mazlan b. Idris in Terengganu. . The husband and wife team, together with their assistant, were responsible for at least 5 murders which were apparently carried out to obtain a type of potion called "minyak dagu" (which literally means:- oil from the chin) to which they claim can give the owner supernatural powers and everlasting youth. However, upon their conviction of the murder of the State Assemblyman, they were hanged and subsequently buried at Petaling Jaya.

then beheaded on separate occasions, but the modus operandi was the same i.e. as they were induced to lie down on the floor at the suspects home on the pretext of supernatural healing. The remains of the victims were excavated from their graves and the skull and bones sent for forensic examination.

The skull of both the husband and wife at the mortuary[58]



Ante mortem photographs of the couple used in the superimposition.

[58] Kemaman Police Investigation Paper 235 / 93.

For the process of identification, the skulls were examined by Prof. Masatsugu [59]. The police photographers were instructed to make life sized photographs of the two suspected victims based on the measurements values of the skulls. Then each skull and the life sized photograph of the corresponding victim were compared by the craniofacial photo superimposition method.

Identification of the Husband[60]

Determination of sex: The skull is the most important area for sex estimation after the pelvis. Generally, the marks of sex on the skull may be summarized by stating that males are more robust than females. In this case, from the lateral view of the skull, it was observed that there was a prominent super orbital ridge, inclined frontal bone, large mastoid process of the temporal bone and prominent muscle markings in the region of the external surface of the mandibular angle and in the relief of the temporal line. From the frontal view, a wider zygomatic arch and robust image were observed. These features obviously indicated that the victim skull was that of a male.

Estimation of age: Further the age was estimated at less than 30 years based on the findings of the sutures and dental attrition. Namely the attrition was limited to the enamel and the dentine on the occlusal surface could not be

[59] Present during this examination , apart from the police investigation team , were Dr. Abdul Rahman, Senior Consultant, Forensic Medicine Unit, Kuala Lumpur Hospital and Dr. Phrabakaran Nambiar, who is at present the Head, Oral Radiology Division, Dental Faculty, University of Malaya. Forensic Anthropological and Odontological examination was done by Dr. Phrabakaran.

[60] For a full report refer to Appendix VII at page 126.

seen. Also palatal sutures were not fused and in particular the incisal was still existent. These finding helped in determining the age probability.

Identification of victim: When superimposition was done on the photograph of the suspected victim to that of the skull it was observed that they matched exactly. The upper lateral incisors and canines superimposed precisely. Further the positional relationship in anatomy between the eyebrows, eyes, nose, mouth, margin of the lower jaw and ears on his face and super orbital ridges, orbits, nasal opening, teeth, chin and external acoustic foramen on the skull corresponded with one another. Thus it was concluded that the skull did indeed belong to the suspected victim.

Identification of the wife[61]

Determination of sex: In this case, from the lateral view of the skull, no super orbital ridge, vertical frontal bone, small mastoid process of the temporal bone and weak markings in the region of the external surface of the mandibular angle, was observed. From the frontal view, a narrower zygomatic arch and gracile image were observed. These findings were characteristics of a female.

Estimation of age: Age of the skull was estimated as 20's based on the findings of the sutures and dental attrition. Namely, the attrition was limited to the enamel and the dentine on the occlusal surface of the dentition could not be seen. Also the palatal sutures were not fused and the incisal suture

[61] For a full report refer to Appendix VIII at page 133.

was still existent. Thus the findings indicate that the skull is less than 30 years old.

Identification of victim: Superimposition of the photograph of the suspected victim and that of the skull was then done for identification purposes. It was observed that the features observed on the skull corresponded exactly to that of the face of the suspected victim. The upper canines superimposed precisely between the two photographs. Further the positional relationship in anatomy between the eyebrows, eyes, nose, mouth, margin of the lower jaw and ears on her face and super orbital ridges, orbits, nasal opening, teeth, chin, and external acoustic foramen of the skull matched exactly. Thus it was concluded that the skull belonged to the suspected victim.

The positive identification of both the victims by craniofacial identification thus put to rest the question of identity. Nonetheless this evidence was not produced in court since the three accused were charged and convicted for their much publicized murder of State Assemblyman YB Dato Hj. Mazlan b. Idris.

LEGAL ASPECTS OF CRANIOFACIAL SUPERIMPOSITION EVIDENCE

To date, the question of relevancy and admissibility of the opinion evidence of the craniofacial superimposition expert has been discussed in the Malaysian courts in at least three cases[62]. Nevertheless there is growing awareness of this field of identification and it is expected that more such applications on the relevance and admissibility of such evidence would be made in Malaysian courts.

We have to first see whether this evidence is relevant and admissible in court.

a) *The issue of Relevancy of Craniofacial Superimposition Evidence*

Before the opinion evidence of any expert could be considered by the courts, including that of craniofacial expert, it has to first be shown to be relevant as required under section 45 of the Evidence Act 1950 which states:

> *Section 45*
>
> *(1) When the court has to form an opinion upon a point of foreign law or* ***of science*** *or art, or as to identity or genuineness of handwriting or fingerprint impressions, the opinions upon that point of* ***persons***

[62] One each in the Court of Appeal, High Court and the Magistrates Court

specially skilled in that *foreign law, science, or art, or in questions as to identity or genuineness of handwriting or fingerprint impressions,* ***are relevant facts.***

(2) Such persons are called experts.

Thus opinion evidence of an expert is relevant if it is on matters of foreign law or of science or art, or as to the identity or genuineness of handwriting or finger impressions.

Can craniofacial superimposition be considered, in law, to be on a point of science?

As was discussed earlier craniofacial superimposition is a scientific method[63] of comparing the characteristic features of a skull with a photograph of a person whose identity is known. This study of 'craniofacial superimposition' would in the literal sense, fulfill the requirements of the terminology ' science'.

In addition, with reference to the legal framework, this expression 'science' is capable of a wide interpretation [64] . Raja Azlan Shah J (as His Highness

[63] Refer to unpublished article ; " Research over the Legal Medical Anthropological Identification Standard for Skull-Image Identifying" by Cai Dongsheng and Lan Yuwen, Teiling 213 Research Institute, Liaoning Province, China.

[64] Paul , Augustine , Evidence; Practice and Procedure (2nd ed 2000) Malayan Law Journal

then was) had this to say regarding the expression 'science or art', in the case of *Chandrasekaran* [65] , a High Court decision:

"The expression 'science or art' is elastic enough to be given a liberal interpretation. ...was not specifically mentioned in section 45 , then equally there is no mention of handwriting or foot-print or telephony and yet the evidence of handwriting, foot-print or telephonic experts has been held admissible. So also of ballistic or medical experts who too have not been mentioned in section 45."

Thus, though there is no mention of the word craniofacial superimposition expert under section 45 of the Evidence Act 1950, it would nevertheless include it if we construe the liberal interpretation given by Raja Azlan Shah J (as His Highness then was).

This has been given further weight in the case of *Leong Wing Kong* [66] where it was stated by Yong Pung How CJ that,

"...if the evidence covers an area of 'science or art'. The scope of the term has been widely construed and is not restricted to the subjects of pure science and art. Stephen's Digest states

[65] Chandrasekaran v PP (1971) 1 MLJ 159
[66] Leong Wing Kong v PP (1994) 2 SLR 54

that the words should include all subjects on which a course of special study or experience is necessary to the formation of an opinion."

In the English case of *Stockwell*[67] the Lord Chief Justice observed that the trial judge described the scientific evidence of the superimposition expert as " breaking new ground" and then quoted with approval the observation by him:-

"One should not set one's face against fresh developments, provided they have a proper foundation..."

Further in the case of *Clarke*[68] where the facts adduced were a man had entered the Barclays Bank branch at Essex with a loaded sawn-off shotgun. He was wearing a baseball cap and a scarf which hid the bottom and lower part of his face. Photographs were taken of the robber during the robbery by an automatic camera in the bank. The evidence in question was that of video superimposition mapping where the expert witness had superimposed photographs taken during the robbery to that of the accused. Having compared the two photographs it was concluded by the expert that accused and the robber were the same person. Thus when the evidence of

[67] R v Stockwell 97 Cr App Rep 260
[68] R v Clarke The Times 26 Dec 1994, Court of Appeal (Criminal Division), Lexis UK CD 553, [1995] 2 CR App Rep 425

the superimposition expert was questioned by the defence, Steyn J. stated that:

"It is essential that our criminal justice system should take into account modern methods of crime detection. It is no surprise, therefore, that tape recordings, photographs and films are regularly placed before juries. Sometimes that is done without expert evidence, but, of course, if that real evidence is not sufficiently intelligible to the jury without expert evidence, it has always been accepted that it is possible to place before the jury the opinion of an expert in order to assist them in their interpretation of the real evidence."

Following this, in the case of *Hookway*[69] LJ Rose rejected the counsel submission that ' *these are comparatively early days in the forensic skill of facial mapping and at the moment there is no database and thus impossible to know how many others may look the same as a particular accused'.*

Thus in the Malaysian case of *DP Vijendran v PP*[70] the argument that the field of expertise is not a recognized field by the scientific and legal community was rejected by the High Court and this decision was

[69] R v Hookway (1999) Crim LR 750.
[70] DP Vijandran v PP (1999) 1 MLJ 385 , for facts of case see page 28

subsequently concurred by Gopal Sri Ram JCA in the Court of Appeal. This would in a way put to rest the question of acceptance of the scientific nature of craniofacial superimposition evidence.

With all the above it can be seen that the craniofacial superimposition expert opinion is within the expression 'science' as required under section 45 of the Evidence Act 1950.

The question of 'persons specially skilled in that'.

Now comes the question of the expertise of the craniofacial superimposition expert. Does it fulfill the requirements of the Evidence Act 1950? The test to be applied to determine whether a person is a craniofacial superimposition expert or otherwise is the same as for other experts. A useful pointer is as stated by Mohamed Azmi SCJ in the case of *Junaidi* [71] :

> *"The specialty of the skill required of an expert under section 45 would depend on the scientific nature and the complexity of the evidence sought to be proved. The more scientific and complex the subject matter, the more extensive and deeper will the court be required to enquire into the ascertainment*

[71] Junaidi b. Abdullah v PP (1993) 3 MLJ 217

of his qualification or experience in the particular field of art, trade or profession."

His Justice further added that:

"The lack of qualification or experience on the part of the expert must necessarily affect the weight of the evidence rather than admissibility. But where the evidence is of a complex and scientific nature, the absence of both qualification or experience can certainly affect admissibility."

Thus for the evidence of a craniofacial superimposition expert to be adduced in court, it must be first proved that the 'superimposition expert' is in fact an expert as required in law. Being a scientific comparison between the photograph of the skull and that of the ante mortem image, the craniofacial superimposition forensic scientist must show both qualification and experience.

This was shown to be so in the case of *John a/k Nyumbei*[72] where during the summing up the evidence of the craniofacial superimposition expert was accepted by Mr. Justice Denis Ong Jiew Fook, who said:

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[72] Unreported Kuching High Court decision: Criminal Trial No: KG 1 of 1994/1. Case is in respect of Bau Police Report 153 / 93. See facts as per page 43.

"Professor Dr.Masatsugu Hashimoto testified that he was Assistant Professor in Tokyo Dental College, Doctor of Dental Science, Councillor of Medico-Legal Society Japan, Councillor of Association of Oromaxillofacial Biomechanics and a member of various International Forensic Associations. He said that he had given evidence in the courts in Malaysia as an expert and his expert evidence was accepted by the courts in Mary Anne case and Vijendran case ...based on his professional qualifications and experience in forensic science and the acceptance by the Courts in Malaysia of expert evidence,[the expert] is eminently an expert within the meaning of sec 45 of the Evidence Act. His expert opinion is entitled to some weight..."

Thus 'prima facie' the evidence of a craniofacial superimposition expert would fulfill the requirements of relevancy as required under section 45 of the Evidence Act 1950. It is a science, and provided the superimposition expert can show his qualifications and experience, the evidence of such is relevant. But now the main question is the admissibility of such evidence. Is the evidence of the craniofacial superimposition forensic scientist's admissible?

b) Admissibility of craniofacial superimposition expert opinion.

It is a generally established principle of case law that an expert's evidence is only admissible to furnish the court with scientific information which is likely to be outside the experience and knowledge of a judge.

This opinion can be seen in the case of *Chou Kooi Pang* [73] where Yong Pung How CJ stated that:

> *".. it is well established that expert opinion is only admissible to furnish the court with scientific information which is likely to be outside the experience and knowledge of a judge. If, on the proven facts a judge can form his own conclusions without help, the opinion of an expert is unnecessary."*

His Lordship had in effect followed the judgment in the case of *Turner* [74] where a psychiatrist's evidence was held inadmissible where its purpose was, in effect, to tell the jury how an ordinary person, not suffering from any mental illness, was likely to react to the strains and stresses of life. The dictum by Lawton LJ in the case of *Turner* gives a useful guidance:

> *"An expert's opinion is admissible to furnish the court with scientific information which is likely to be outside the*

[73] Chou Kooi Pang v PP (1998) 3 SLR 593
[74] R v Turner (1975) 1 All ER 70

experience and knowledge of a judge or jury. If on the proven facts a judge or jury can form their own conclusions without help then the opinion of an expert is unnecessary. In such a case if it is given dressed up in scientific jargon it may make judgment more difficult. The fact that an expert witness has impressive scientific qualifications does not by that fact alone make his opinion on matters of human nature and behavior within the limits of normality any more helpful than that of the jurors themselves; but there is a danger that they may think it does ."

Thus we can see that the scope of the section 45 is for opinion evidence which is outside the knowledge and experience of the court. This assertion is fortified by the following, where Abdul Hamid FJ (as he then was) stated in the case of *Syed Abu Bakar* [75]

"The scope of this section...while recognizing that opinion in so far as it may be founded on legal evidence shall be the function of the tribunal whose province alone it is to draw conclusions of law or fact."

There are several instances where courts have rejected the admissibility of so called expert evidence on the ground that it encroaches into the judge's domain i.e. within

[75] Syed Abu Bakar b. Ahmad v PP (1984) 2 MLJ 19.

the knowledge and experience of the judge. In *Turner's* case the court rejected the opinion evidence of the expert on the question of acts of blind rage when discovering unexpected wantonness on the part of their loved ones. This the court held was matters which are well within ordinary human experiences. In the case of *Weightman* [76]a psychiatrist's evidence was held inadmissible where its purpose was, in effect, to tell the jury how an ordinary person, not suffering from any mental illness, was likely to react to the strains and stresses of life.

Thus a point to note is the case of *R v Stockwell*[77]. This is a case which involves a bank robbery. The robber was disguised and the prosecution tendered facial mapping evidence through an expert. The principal point on appeal was whether the judge had rightly permitted that expert evidence to be adduced. The court referred to the decision on *Turner*[78] and then remarked as follows:-

> *"Where for example, there is a clear photograph and no suggestion that the subject has changed his appearance, a jury could usually reach a conclusion without help. Where, as here , however, it is admitted that the appellant had grown a beard shortly before his arrest, and it is suggested further that the robber may have been wearing clear spectacles and a wig for disguise, a comparison of*

[76] R v Weightman (1991) 92 Cr App R 291
[77] R v Stockwell 97 Cr App Rep 260
[78] R v Turner (1975) 1 All ER 70

the photograph and defendant may not be straightforward. In such circumstances we can see no reason why expert evidence, if it can provide the jury with information and assistance they would otherwise lack, should not be given. In each case it must be for the judge to decide whether the issue is one on which the jury could be assisted by expert evidence, and whether the expert tendered has the expertise to provide such evidence."

The court then rejected the submission that the expert evidence ought not to have been admitted because it was not necessary; the jurors could for themselves have seen the photographs.

In a Malaysian context the evidence of a craniofacial superimposition expert have been deemed admissible in the cases of *Vijandran* [79] which is a Court of Appeal decision and the unreported High Court case of *John a/k Nyumbei* [80]

[79] DP Vijandran v PP (1999) 1 MLJ 385.
[80] Unreported Kuching High Court decision: Criminal Trial No: KG 1 of 1994/1.

DISCUSSION

As stated in the earlier chapters there are two general methods of facial superimpositions, the first being photographic superimposition and the later being video superimposition. Most modern forensic investigators prefer the video superimposition and some like McKenna (1986) even state that it is superior to that of photographic superimposition. Venkiteswaran (2001) when comparing the two modes of superimposition stated that, " The video technique reduces the working time as the superimposed image can be viewed instantaneously while the adjustment of skull orientation is done". On the other hand for photographic superimposition she stated that a considerable amount of time is needed as the trial and error method involves the capturing of the superimposed image on film each time an adjustment is done. Further in a video superimposition the coordinates of the skull orientation are reproducible as they can be stored in computer software. In addition, in the video method, the three dimensional skull is transformed into a two dimensional image and is compared with another two dimensional image of a photograph. This would thus be more accurate in comparison than even the Furue's method of superimposition, where a direct superimposition is made of the three dimensional object (skull) on a two dimensional image (photograph).

.Notwithstanding the 'superiority' of video superimposition over photographic superimpositions, there are two basic tenets that need to be carefully observed. It is of utmost importance that the photographic equipment employed is of adequate resolution

and detail, and that great care is taken in the alignment of the skull. On the human factor, it is essential that the forensic investigator have a thorough understanding of cranial anatomy and soft tissue form and relationship and he must also show total professional objectivity in avoiding misidentification.

Taylor and Brown (1998) have further named several factors that can enhance the reliability of video superimposition. They are:-

1. Video Cameras: The optical performance of the video cameras should be assessed. Cameras that introduce distortions into images should not be used. If two video cameras are used, they should produce images of a similar quality so that valid comparisons can be made.

2. Ante Mortem Photograph: The limiting factor in any craniofacial superimposition comparison is the quality of the ante mortem photograph. It is therefore advisable to base a statement of identity on comparisons with a number of good quality photographs that show the face from a variety of viewpoints.

3. Photographic Conditions If possible the exact photographic conditions under which the ante mortem photograph was taken should be discovered. In particular, the distance at which the photograph was taken and the focal

	length of the lens used in the camera should be noted. If these details cannot be discovered close approximations should be made, although the accuracy of the results would likely be affected. The video camera must also be placed at the same distance from the skull as that from which the ante mortem photograph was taken.
4. Orientation	The orientation of the skull should reproduce the viewpoint from which the ante mortem photograph was taken.

Notwithstanding the above, the objectivity of the forensic investigator is, as stated above, equally important in assessing the corresponding features. With this, it would now be prudent to objectively discuss the reliability of superimposition techniques and state the importance placed on it by the courts of law.

On the question of reliability, craniofacial superimposition is, in the absence of other identification procedures like fingerprint, DNA and dental analysis, a valid and reliable method of identification of an unknown skull. As has been shown above, it has been useful in positively identifying victims by forensic investigators in various parts of the world. On the other hand it should be admitted that there has been some legal

controversy[81] over the reliability of craniofacial superimposition evidence. Scientific papers have also been used by counsel to conjure up some of the defense against the usage of such evidence

Research has shown that there had been instances where the reliability of superimposition evidence is questionable, for instance where Koelmeyer (1982) had claimed to achieve a good match using video superimposition of a skull with a photograph of a person known to be alive. This clearly showed some flaws in this type of identification, though it has been argued that the identification by Koelmeyer was with an incomplete skull (i.e. it lacked a mandible) and thus a complete skull is necessary for identification. On the same point, a case of misidentification was reported by Dorion (1983) in which one skull was identified by two different forensic investigators as being that of two different persons. It was nevertheless agreed by Koelmeyer (1982) and Dorion (1983) that superimposition should not be used as the sole means of identification but limited to provide exclusion or corroboration only.

On the other hand, many authors have endorsed the capabilities of superimposition as a method of reliable identification, for example Furuhata and Yamamoto (1967) referred to it as 'useful' whilst Kamijo and Sakai (1970) stated it to be a 'powerful method' of identification. On the comparison between the photographic and video superimposition techniques, Brown (1983) preferred the latter as it 'appeared to provide a much higher measure of reliability' than did the photographic method. Similarly Helmer *et al* (1989) considered craniofacial video superimposition to be a

[81] See the case of DP. Vijandran v Public Prosecutor (1999) 1 MLJ 385 where the defense counsel had raised objections on the reliability of such evidence and the case of R v Clarke where it was argued that " The technique was too dangerous and that the technique resulted in a fuzzy picture..."

valid method of identification provided that it is performed with the 'utmost accuracy' using high quality equipment and an ante mortem photograph of good quality. McKenna (1986 ; 1988) in justifying this method of identification in view of the adverse comments by earlier forensic investigators like Koelmeyer (1982) and Dorion (1983) , stated that superimposition was at that time not as good or reliable as now, but he nevertheless acknowledged that though the technique was gaining credibility the best measure of its success and reliability was its acceptance by the courts of law.

CONCLUSION

As has been stated above, the acceptance of craniofacial superimposition is quite established in the courts in most Commonwealth countries. Judges are now willing to accept the reliability of such evidence and in a Malaysian context this evidence must fulfill the requirements of relevancy and admissibility as required under section 45 of the Evidence Act 1950. The Court of Appeal case of *DP Vijandran* has also set a precedent in its admissibility and it is thus expected that more cases would be forthcoming from the law enforcement authorities who can make use of this development of science and law in their pursuit of justice. However it should be noted that, only the opinion evidence of well qualified experts would be accepted provided their method of craniofacial identification is performed with proper equipment and with good quality photographs.

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APPENDIX I

Examination Report

December 11, 1991

To: Deputy Superintendent Blossom Wong (D9)
C.I.D. HQ. Bukit Aman, Kuala Lumpur.

From: Assistant Professor Masatsugu Hashimoto
Department of Forensic Odontology, Tokyo Dental College
Masago 1-2-2, Chiba-shi, Japan

I examined the video images recorded in the tape, which you sent me on 2nd of December, 1991. These images are the comparisons of the pictures (perhaps from the pornographic tape) with the "alleged victim". The video images showed the comparisons of several parts of the body. My findings in each part are as follows;

(1) On the comparison of the standing position:

Video superimpose techniques makes it possible to compare the similarity of body characteristics such as height and proportion between two images. In this method, the most important thing is to reconstruct the condition which the picture was taken. In this case, the picture edited form the pornographic tape was taken from lower level. though alleged victim was taken from a bit higher position. Therefore, a small parallax error can be observed. I think this error is not so critical for comparison. From the superimposed image, similar length and proportion from the top of the head to the hip position in two images are observed. But the position of the foot is apparently different. This finding gives me the impression that alleged victim is taller than the girl in the pornographic video tape.

(2) On the comparison of right foot:

From the comparison of two images, the length of each toe against the total length of the foot seems to be different. The girl in the pornographic video tape has longer toes compared to alleged victim than a girl in the videotape.

There are two types of examination methods in Forensic anthropology. They are metrical and non metrical (morphological) ones, and metrical method is quite useful for comparison of the hands and foots. So, I recommend you to apply metrical method to this case in addition to superimpose method.

(3) On the facial profile:

The width of the face, which is the distance between rights and left zygomatic arch, seems to be different in two images. This part is seldom influenced by the thickness of soft tissue. It means the change by age is vary small. Of course, I could not get any information about the position of the girl in the pornographic tape, because I did not have the original tape. So, I could not say about the distortion of the image. So, when you carry out the superimpose method, distortion of the image should be considered.

Furthermore, in my impression, anatomical position of right and left orbits, nose and mouth is also a bit different in two images.

(4) On left hand, fingers:

Nail bed shape on the fourth finger is dissimilar in two images. Also, the position of the thumb to the second finger is higher in the alleged victim than a girl in the pornographic video.

On the basis of the findings above mentioned, in my opinion, the alleged victim and a girl in the pornographic video tape are not the same person.

APPENDIX II

EXAMINATION OF SKELETONIZED BODY

Case Name : Murder Case A 8/93 Box No. 1 (P/Tikus Rpt. 13165/92)	
Date of Discovery :	
Place of discovery :	
Police Reference : P/Tikus Rpt. 13165/92	
Address and Tel. :	
Person in charge of this case : Insp. Rossli Ismail	
Examination material : Skeletonized	
Condition of material : Skeletonized	
Sex. Discrimination : Male	Estimated age :
Race identification : Mongoloid	Estimated stature : 162± 3 cm
Blood grouping (material) : N.D. (Not Determined)	
Carnio-facial characteristics : N.E. (Not Examined)	

RESULT OF IDENTIFICATION

Address :	
Name :	Date Of Birth :
Sex :	Age at death :
Stature :	Blood Type :
Dental record : Yes No	Ante mortem photographs : Yes No

EXAMINATION REPORT

I. INTRODUCTION:

On March 19, 1993, I was asked to examine an unknown body whose number was A 8/93 (Box No. 1). This body was one of four unknown bodies. I examine on the same say and seemed to be Ong Beng Hock @ Niau Choo Kia (ID No: 6240909).

The main purpose of this examination was to estimate the stature of the victim and also apply the superimpose method for positive identification.

Right humerus, right femur and left tibia were measured for stature estimation at the general hospital in the presence of Dr. Bhupinder Singh, Forensic Pathologist and Insp. Rossli Ismail. The photographs of the skull was also taken at the same time.

This report was prepared based on the results of the detailed investigation in Japan.

II. BONES RECOVERED:

I did not examine all the skeletal remains existed.

See the report by forensic pathologist.

III. CONDITION:

I do know the condition of the body when this was recovered (fresh, decomposed, skeletonized or burned).
However, the material which I examined was skeletonized. The long bones which I measured were artificially cleaned of all soft tissue remains ant their condition were very fragile.

IV. PATHOLOGIST CONDITIONS:

Not examined

Refer the report by forensic pathologist.

V. MALFORMATION (INCLUDING HEALED FRACTURE):

As far as I examined on three long bones, I could not find any malformation on them. But I did not observe all of other bones.

VI. TRAUMA:

No trauma was found on the bones I examined. On the other bones, the report by forensic pathologist should be referred.

VII. CAUSE OF DEATH:

Not examined.

Refer the report by forensic pathologist

VIII. TIME LAPSE SINCE DEATH:

Not detected.

Refer the report by forensic pathologist

IX. RACE IDENTIFICATION:

Morphological features of the skull such as the shape of the skull, eye and nasal openings, flatness of the face, indicated that the victim belongs to the Mongoloid group.

X. DETERMINATION OF SEX:

The prominent super orbital ridge, wider zygomatic arch and big mastoid process indicated that the victim was that of a male.

XI. ESTIMATION OF AGE AT DEATH:

Not examined.

Refer the report by forensic pathologist

XII. BLOOD TYPE:

Not detected.

Refer the report by forensic pathologist.

XIII. STATURE ESTIMATION (INCLUDING PROPORTION):

Stature was estimated from right humerus, right femur and left tibia, using the regression formula of several methods and multiple regression equations of Fuji method, which were developed using Mongoloid samples.
The estimated statures obtained from the methods mentioned above (See the appended form of estimated stature) were discussed and adjusted based on my experience.
The results were as follows;

Range : 59-165 cm
Most Likely : 162 cm

XIV. ESTIMATION OF BODY BUILD:

Not examined.

XV. CRANIO-FACIAL CHARACTARISTIC:

Not examined.

XVI. IDENTIFICATION OF HANDEDNESS:

Not examined.

XVI. TRAITS PECULAR TO THE INDIVIDUAL:

Not examined.

XVII. INDIVIDUATION:

I received an ante mortem photograph of a suspected victim, Ong Beng Hock @ Niau Choo Kia (Fig. 1) on 6th of may, 1993.
Then, I tried to superimpose this photograph on the photograph of the skull (Fig. 2). But, the conditions under which these photographs were taken showed big differences apparently. Therefore, it was impossible to get the conclusion by the superimposition of these two photographs.
I recommend taking the photograph and then superimposed again. For this purpose, I appended the transparent photograph of the suspected victim (Fig.3). Also, the measurement values of the skull are available for the comparison of the ones of the face on the photograph of the suspected victim, Ong Beng Hock.

XIX. SUMMARY:

The skeleton in the box number 1, which was presented to me at General Hospital in Penang on March 19, appeared to be that of a Mongoloid male.
He stood between 159 cm and 165 cm, centering around 162 cm. For superimposition, the photograph of the skull should be taken again. Also, measurement of the skull is recommended,

Detailed description should be referred above.

20th May, 1993

Dr. Masatsugu Hashimoto
(B.S., D. Dent. Sci.)

Assistant professor of Forensic Odontology and Physical Anthropology Tokyo Dental College, Masago 1-2-2, Mihama-ku, Chiba-shi, JAPAN.

EXAMINATION OF SKELETONIZED BODY

Case Name : Murder Case A 9/92 Box No.2 (P/Tikus Rpt. 13166/92)	
Date of Discovery :	
Place of discovery :	
Police Reference :	
Address and Tel. :	
Person in charge of this case : Insp. Rossli Ismail	
Examination material : Skeletonized body	
Condition of material : Skeletonized body	
Sex. Discrimination : Male	Estimated age : late 20's
Race identification : Mongoloid	Estimated stature: 172+__2.5 cm
Blood grouping (material) : N.D. (Not Determined)	
Carnio-facial characteristics: super rounded & high skull, medium to high skull, narrow forehead, medium total face, low upper face and so on.	

RESULT OF IDENTIFICATION

Address :	
Name :	Date Of Birth :
Sex :	Age at death :
Stature :	Blood Type :
Dental record : Yes No	Ante mortem photographs : Yes No

EXAMINATION REPORT

I. INTRODUCTION:

On March 19, 1993, I was asked to examine an unknown body whose number was A 9/92 (Box No. 1). This body was one of four unknown bodies.
I examine on the same say and seemed to be Ooi Tyan Foo @ Tau Hoo (ID No: A0308766).
The main purpose of this examination was to estimate the stature of the victim and also apply the superimpose method for positive identification.
The measurement of the skull and long bones were done at the general hospital in the presence of Dr. Bhupinder Singh, Forensic Pathologist and Insp. Rossli Ismail. The photographs of the skull were also taken at the same time.

This report was prepared based on the results of the detailed investigation in Japan.

II. BONES RECOVERED:

Detailed examination was not done

Refer the report by forensic pathologist.

III. CONDITION:

I do know the condition of the body when this was recovered (fresh, decomposed, skeletonized or burned).
However, the material which I examined was skeletal remains. These bones were artificially cleaned of all soft tissue remains ant their condition were very fragile.

IV. PATHOLOGIST CONDITIONS:

Detailed examination was not done.

Refer the report by forensic pathologist.

V. MALFORMATION (INCLUDING HEALED FRACTURE):

Detailed examination was not done.

Refer the report by forensic pathologist.

VI. TRAUMA:

Detailed examination was not done.

Refer the report by forensic pathologist.

VII. CAUSE OF DEATH:

Detailed examination was not done.

Refer the report by forensic pathologist.

VIII. TIME LAPSE SINCE DEATH:

Not detected.

Refer the report by forensic pathologist.

IX. RACE IDENTIFICATION:

Morphological features of the skull such as the shape of the skull, nasal opening, flatness of the face, indicated that the body belongs to the Mongoloid group. Metrical examination (see the appended form of measurement of the skull) also supported this view.

X. DETERMINATION OF SEX:

Morphological features of the skull apparently showed that the victim was male. All of measurement values except maximum cranial length indicated same result. In addition to them, robustness of the long bones in the extremities also supports the same view.

XI. ESTIMATION OF AGE AT DEATH:

Detailed examination was not done. But from dental conditions including tooth attrition; the victim was estimated to be late 20's to around 30.

XII. BLOOD TYPE:

Not examined.

Refer the report by forensic pathologist.

XIII. STATURE ESTIMATION (INCLUDING PROPORTION):

Stature was estimated from all of long bones, namely, humerus, radius, ulna, femur, tibia and fibula, using the regression formula of several methods and multiple regression equations of Fuji method, which were developed using Mongoloid samples.
The estimated statures obtained from the methods mentioned above (See the appended form of estimated stature) were discussed and adjusted based on my experience.
The results were as follows;

Range : 170-175 cm
Most Likely : 172.5 cm

XIV. ESTIMATION OF BODY BUILD:

Not examined.

XV. CRANIO-FACIAL CHARACTARISTIC:

Based on the measurement values of the skull, each index showing the characteristics of the head and face was calculated (see the appended form of measurement of the skull)

From the index values, the head of this victim was classified as super rounded and medium to high skull. In the same manner, the face was classified into medium group though forehead was narrow. Total facial index showed medium face, but upper facial index showed broad or low face. It means that the lower part of the face was comparatively longer than the upper part of the face.

Orbital and nasal index showed respectively that the victim had a high orbit and broad nose.

XVI. IDENTIFICATION OF HANDEDNESS:

Not examined.

XVII. TRAITS PECULAR TO THE INDIVIDUAL:

Not examined.

XVIII.INDIVIDUATION:

I received an ante mortem photograph of a suspected victim, Ooi Tyan Foo @ Tau Hoo (Fig. 1) on 6th of may, 1993. Facial characteristics observed on this photograph were as follows; narrow forehead, longer lower jaw, broad nose and wider zygomatic arch. These findings corresponded with ones of the skull.

Then, the photograph of the skull and his photograph were superimposed (Fig.2). Anatomical position of each part between the skull and the face was superimposed well except zygomatic bone of the right side. The cause of this disagreement was easily explained that two photographs superimposed were taken under the slightly different conditions. Therefore, if the skull was taken again under the same condition which the ante mortem photograph was taken, it seems to be possible to get the exactly corresponding image of the skull to the ante mortem photograph.

So, I conclude, in my opinion that the skull belongs to Ooi Tyan Foo with very high possibility. However, positive identification should be made by superimposing the ante mortem photograph with the skull photograph which is taken under the same photographing conditions which the ante mortem photograph was taken. For this further examination, I appended the life-size photograph of Ooi Tyan Foo, which was enlarged based on the measurement values of the skull.

XIX. SUMMARY:

The skeleton to me at General Hospital in Penang on March 19, 1993 appeared to be of a Mongoloid male aged late 20's.

He stood between 170 cm and 175 cm, centering around 172.5 cm.

His cranio-facial characteristics were surrounded and almost high skull, narrow forehead, medium total face with broad upper face. Shape of his nose seemed to be broad.

On the comparison of the skull with suspected victim, Ooi Tyan Foo, in my opinion, the possibility that skull belongs to this person seems to be very high.

Detailed description should be referred above.

20th May, 1993

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EXAMINATION OF SKELETONIZED BODY

Case Name : Murder Case A 10/93	
Date of Discovery : 31 December 1992	
Place of discovery : Mt. Erskein, Cemetry	
Police Reference : P/Tikus Rpt. 13234/92	
Address and Tel. :	
Person in charge of this case : Insp. Rossli Ismail	
Examination material : Skeletonized	
Condition of material : Skeletonized	
Sex. Discrimination : Male	Estimated age : 30's or 40's
Race identification : Mongoloid	Estimated stature : 171± 2 cm
Blood grouping (material) : N.D. (Not Determined)	
Carnio-facial characteristics: rounded & high skull, narrow & clear – cur face, high total face, medium upper face and so on.	

RESULT OF IDENTIFICATION

Address :	
Name :	Date Of Birth :
Sex :	Age at death :
Stature :	Blood Type :
Dental record : Yes No	Ante mortem photographs : Yes No

EXAMINATION REPORT

I. INTRODUCTION:

On March 19, 1993, I was asked to examine an unknown body whose number was A 10/93. This body was found at the cemetery in Mt. Erskein, Penang on 31 December 1992 and one of four unknown bodies I examined on the same day.

The purpose of this examination was to obtain the information for personal identification of the victim.

The forensic anthropological examinations including the measurements of the skull and long bones were done at the general hospital in the presence of Dr. Bhupinder Singh, Forensic Pathologist and Insp. Rossli Ismail. The photograph of the skull was also taken at the same time.

This report was prepared based on the results of the detailed investigation in Japan.

II. BONES RECOVERED:

See the skeletal chart in the appended examination form of skeletonized body. Most of the bones were recovered, but the fourth cervical vertebra, the 12th rib of right side, one rib of left side, all of the hand bones except three metacarpal bones, right patella and two of foot bone were missing.

III. CONDITION:

I do know the condition of the body when this was recovered from the cemetery in Mt.Erskine (fresh, decomposed, skeletonized or burned). However, the materials which I examined were skeletal remains. These bones which I measured were artificially cleaned of all soft tissue remains ant their condition were very fragile.

IV. PATHOLOGIST CONDITIONS:

I could not detect pathological changes on any of the bones.

The report by forensic pathologist should be referred.

V. MALFORMATION (INCLUDING HEALED FRACTURE):

Not detected.

VI. TRAUMA:

Not detected.

VII. CAUSE OF DEATH:

The bones gave no identification of the possible cause of death, as far as I examined.

Refer the report by forensic pathologist.

VIII. TIME LAPSE SINCE DEATH:

I can not estimate the time after death because I do not know the condition of the body before being cleaned and environmental condition where the body was found.

The report by forensic pathologist should be referred.

IX. RACE IDENTIFICATION:

Morphological features of the skull such as the shape of the skull, eye and nasal openings, flatness of the face, indicated that the victim belongs to the Mongoloid group.

Metrical examination (see the appended form of measurement of the skull) the dental characteristics such as the shape of dental arch and shovel-shaped incisors also supported this view.

X. DETERMINATION OF SEX:

In addition of the features of the skull, the angles of the sciatic notches and total shape of the pelvis indicated that the skeleton is apparently that of a male. The long bones such as humerus and femur also had the features which support this view.

XI. ESTIMATION OF AGE AT DEATH:

All epiphyses were fused, suggesting an age greater than 25 years. Also, incisal suture, which exists in maxilla bones, had already fused, indicating more than 30 years. Dental condition showed the possibility that this individual might be 40's.

XII. BLOOD TYPE:

Not examined.

Refer the report by forensic pathologist.

XIII. STATURE ESTIMATION (INCLUDING PROPORTION):

Stature was estimated from right humerus, right femur and left tibia, using the regression formula of several methods and multiple regression equations of Fuji method, which were developed using Mongoloid samples.
The estimated statures obtained from the methods mentioned above (See the appended form of estimated stature) were discussed and adjusted based on my experience.
The results were as follows;

Range :	169-173 cm
Most Likely :	171 cm

XIV. ESTIMATION OF BODY BUILD

From the condition of muscular attachment on the bones, it seemed that this victim had a good muscularity.

XV. CRANIO-FACIAL CHARACTARISTIC:

Based on the measurement values of the skull (Fig. 1), each index showing the characteristics of the head and face was calculated (See the appended form of measurement of the skull).

From the index values, the head of this victim was classified as rounded and high skull. In the same manner, the face was classified as narrow and clear-cut face. Total facial index showed high face, but upper facial showed medium face. It means that the lower part of the face was comparatively longer than the upper part of the face.

Orbital and nasal index showed respectively that the victim had a medium orbit and broad nose.

XVI. IDENTIFICATION OF HANDEDNESS:

The head of left humerus was bigger than the one of right humerus, suggesting that the victim might be left handed. The size of clavicles also supported this view.

XVII. TRAITS PECULAR TO THE INDIVIDUAL:

Upper central incisors were missing in his life and the space was replaced by the partial denture.

XVIII.INDIVIDUATION:

Not applicable at this time.

XIX. SUMMARY:

The skeleton presented to me at General Hospital in Penang on March 19, 1993 appeared to be that of a Mongoloid male, ranging in age more than 30 (perhaps 30's to 40's) .

He stood between 169 cm and 173 cm, centering around 171 cm.

His cranio-facial characteristics were rounded and high skull, narrow and clear-cut faced high total face with medium upper face. Shape of his nose seemed to be broad.

No evidence of cause of death was discovered in the skeleton.

Detailed descriptions should be referred above.

20th May, 1993

Dr. Masatsugu Hashimoto
(B.S., D. Dent. Sci.)

Assistant professor of Forensic Odontology
and Physical Anthropology
Tokyo Dental College,
Masago 1-2-2, Mihama-ku,
Chiba-shi, JAPAN.

EXAMINATION OF SKELETONIZED BODY

Case Name : Murder Case no 4 Tan Kiat Theng @Chi Kut Tin	
Date of Discovery : 10 MARCH 1993	
Place of discovery : Mt. Erskein, Cemetery, Penang	
Police Reference : P/Tikus Rpt. 2868/93	
Address and Tel. :	
Person in charge of this case : Insp. Rossli Ismail	
Examination material : Skeletonized body	
Condition of material : Skeletonized body	
Sex. Discrimination : Male	Estimated age : 20's to early 30's
Race identification : Mongoloid	Estimated stature : 173± 3 cm
Blood grouping (material) : N.D. (Not Determined)	
Carnio-facial characteristics: rounded & high skull, narrow & clear – cur face, high total face, medium upper face and so on.	

RESULT OF IDENTIFICATION

Address :	
Name :	Date Of Birth :
Sex :	Age at death :
Stature :	Blood Type :
Dental record : Yes No	Ante mortem photographs : Yes No

EXAMINATION REPORT

I. INTRODUCTION:

On March 19, 1993, I was asked to examine an unknown body whose name seemed to be Tan Keat Theng, @ Chi Kert Tin. This body was found at the cemetery in Mt. Erskine, Penang on 10 March 1993 and was one of four unknown bodies I examined on the same day.

The main purpose of this examination was to estimate the stature and to obtain the cranio-facial characteristics of the victim, and also apply the superimpose method for positive identification.

The skull and the right and left humerus were measured at the general hospital in the presence of Dr. Bhupinder Singh, Forensic Pathologist and Insp. Rossli Ismail. The photograph of the skull was also taken at the same time.

This report was prepared based on the results of the detailed investigation in Japan.

II. BONES RECOVERED:

Detailed examination was not done.

Refer the report by forensic pathologist.

III. CONDITION:

I do know the condition of the body when this was recovered (fresh, decomposed, skeletonized or burned).

However, the material which I examined was skeletonized. These bones were artificially cleaned of all soft tissue remains ant their condition were very fragile.

IV. PATHOLOGIST CONDITIONS:

Not examined.

Refer the report by forensic pathologist.

V. MALFORMATION (INCLUDING HEALED FRACTURE):

As far as I examined, I could not find any malformation on the skull and femurs. But I did not observe the other bones.

Refer the report by forensic pathologist.

VI. TRAUMA:

No trauma was found on the skull and femurs which I examined. On the other bones, the report by forensic pathologist should be referred.

VII. CAUSE OF DEATH:

Not examined.

Refer the report by forensic pathologist.

VIII. TIME LAPSE SINCE DEATH:

Not detected.

Refer the report by forensic pathologist.

IX. RACE IDENTIFICATION:

Morphological features of the skull such as the shape of the skull, shape of the orbit and nasal opening, indicated that the body belongs to Mongoloid group. Metrical examination (see the appended form of the measurement of the skull) also supported this view.

X. DETERMINATION OF SEX:

Morphological features of the skull, especially the prominent super orbital ridge and wider zygomatic arch apparently showed that the victim was male. All of measurement values also indicated same result.

XI. ESTIMATION OF AGE AT DEATH:

Detailed examination was not done. As far as I examined, younger generation, namely late 20's to early 30's was estimated.
For further information, dental and X-ray examination is required.

Refer the report by forensic pathologist.

XII. BLOOD TYPE:

Not examined.

Refer the report by forensic pathologist.

XIII. STATURE ESTIMATION (INCLUDING PROPORTION):

Stature was estimated from right and left femurs, using the regression formula of several methods.
The estimated statures obtained (See the appended form of estimated stature) were discussed and adjusted based on my experience.
The results were as follows;

Range :	170-176 cm
Most Likely :	173 cm

XIV. ESTIMATION OF BODY BUILD:

Not examined.

XV. CRANIO-FACIAL CHARACTARISTIC:

Based on the measurement values of the skull, each index showing the characteristics of the head and face was calculated (See the appended form of measurement of the skull).

From the index values, the head of this victim was classified as rounded and high skull. In the same manner, the face was classified as narrow and clear-cut face. Total facial index showed high face, but upper facial showed medium face. It means that the lower part of the face was comparatively longer than the upper part of the face.

Orbital and nasal index showed respectively that the victim had a high orbit and narrow nose.

XVI. IDENTIFICATION OF HANDEDNESS:

Not examined.

XVII. TRAITS PECULAR TO THE INDIVIDUAL:

Not examined

XVIII.INDIVIDUATION:

I received two ante mortem photographs of suspected victim, Tan Keat Theng @ Chi Kert Tin (Fig. 1) on 6th of May, 1993. From the photographs, it was observed that he had a longer lower jaw and comparatively narrow nose. These findings were correspondence with the characteristics obtained from the skull.

Then, the photographs of the skull and one of his photographs were superimposed (Fig.2). In vertical axis, positional relationship of each part (namely, eyebrow, eye, nose, mouth or chin) between the skull and the face corresponded well. In horizontal axis, however, its positional relationship was not matched exactly, because of the slightly difference of the rotation angle of the skull when it was taken. Therefore, I judged it is possible to get the same image of the ante mortem photograph of the suspected victim from this skull.

So, I can conclude in my opinion that the skull belongs to Tan Keat Theng with very high possibility. But positive identification should be made by superimposing the ante mortem photograph with the skull photograph which is taken under the same photographing conditions which the ante mortem photographs was taken. For this further examination, I appended the life-size photograph of Keat Theng, which was enlarged based on the measurement values of the skull.

XIX. SUMMARY:

The skeleton presented to me at General Hospital in Penang on March 19, 1993 appeared to be that of a Mongoloid male, aged late 20's to early 30's

He stood between 170 cm and 176 cm, centering around 173 cm.

His cranio-facial characteristics were rounded almost medium skull, narrow forehead, and high total face with medium upper face. Shape of his nose seemed to be narrow.

On the comparison of the skull with suspected victim, Tan Keat Teng, in my opinion, the possibility that the skull belongs to this person seems to be very high.

Detailed descriptions should be referred above.

20th May, 1993

Dr. Masatsugu Hashimoto
(B.S., D. Dent. Sci.)

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APPENDIX VI

EXAMINATION OF SKELETONIZED BODY

Case name; Murder case in Bau. Kuching Sarawak. MALAYSIA	
Date of discovery : 16 / 3 / 1993 20 : 50	
Place of discovery : Jalan Sebuku, Bau , Kuching , Sarawak , MALAYSIA	
Police reference : BA RPT 153 / 93	
Address and Tel : Police Station, Bau, Kuching, Sarawak, MALAYSIA	
Person in charge of this case: Asp. Sayang Kavang	
Examination material : Skull	
Condition of material : Skeletonized (artificially)	
Sex Discrimination : FEMALE	Estimated age :
Race identification: MONGOLOID	Estimated stature:
Blood grouping (material):	
Carnio-facial characteristics:	

RESULT OF IDENTIFICATION

Address : No. 29, Sebuku Rd, Bau Kuching, Sarawak, MALAYSIA	
Nama :	Date of birth : 1/7/1975
Sex : Female	Age at death : 17 Years 8 MONTHS
Stature :	Blood type :
Dental record : No	Ante mortem photographs : Yes

I. INTRODUCTION:

On March 22, 1993, I was asked by Superintendent Khew Ching Hoi for Director C.I.D. , for Inspector General of Police, Royal Malaysian Police, to go to Kuching and to examine an unknown skull in murder case. Then, I left K.L in the evening of the same day and arrived at Kuching in the night.

On the following day, I went to the mortuary in the Sarawak General Hospital and started the examination at about nine o'clock.

Preliminary examination by Dr. (HAJJAH) SADAR JEHAN, Forensic Pathologist, Central Medical Laboratory and my self, at mortuary revealed that the skull was severely battered and had many fractured parts including lower part of facial bone and left temporal bone (Fig.1). Mandible bone was also broken. Some parts of facial bone and some teeth were postmortem missing. On the top of the skull vault (Parietal bones) four hollows, which were made artificially, were observed (Fig.2). The headless body was not decomposed yet (Figs. 3, 4 and 5). But I did not any further examination on this body.

Following the preliminary examination, initial examination including the X ray examination were carried out at the mortuary and hospital for getting the information for personal identification. Anthropological measurements of the skull were also done and recorded.

Detailed examination was carried out in Japan. The photographs of the skull were taken. These photos were used to superimpose with the ante mortem photographs (Figs. 6 and 7) in Japan, which were provided to me by the police

Based on my examination, this report was prepared.

II BONES RECOVERED:

The skull without maxilla bone was recovered (Fig. 1). And maxilla bone, which was detached from the skull (Fig. 8), and mandible bone were recovered separately.

III. CONDITION:

The skull is quite fresh, but entirely free of soft tissue (Figs. 1 and 2). Multiple fractures were observed on most of the bones recovered. Especially, the bones which form lower face (maxilla and mandible bone) and base of the skull (occipital bone) were damaged severely. Broken part on the left temporal bone was also observed (Fig. 1)

IV. PATHOLOGICAL CONDITIONS

Dental treatments such as amalgam fillings were observed on some of upper teeth (Fig. 8)

Results of pathological examination should be referred.

V. MALFORMATION (INCLUDING HEALED FRACTURE):

None.

As dental arch of Maxilla was very small, there was not enough place for the eruption of all of the permanent teeth. Therefore, left second premolar was congenital missing and right second premolar was transposed palatinally (Fig. 8). In addition to them, left lateral incisor was only slanted palatally (Figs. 8 and 9).

VI. TRAUMA:

Multiple fractures were observed. These fractures seemed to be made artificially after death.
Furthermore, many cut marks, which were inflicted by sharp weapon, were observed on the outer surface of occipital bone.
Also, on the top of the skull vault (Parietal bones), four hollows, which were made artificially, were observed (Fig.2).

The detailed position of the fractures should be referred to pathological examination report.

VII. CAUSE OF DEATH:

See the pathologist examination report.

VIII. TIME LAPSE SINCE DEATH

From the freshness of the skull, it seemed to be short time after death. It was thought that the skeletonization of the head was caused by the artificial removement of soft tissue and cleaning of skull.

IX. RACE IDENTIFICATION:

The skull is undoubtedly belonging to the mongoloid group.

The basis of this result was as follows; the shape of the skull including the measurement values and indices (see a form for measurement value of the skull), the shape of dental arch, shovel shaped incisor and so on.

Also, the shape of the orbit (Orbital index 97.2) was high, which is one of the characteristics of Mongoloid.

X. DETERMINATION OF SEX:

All of the characteristic of the skull indicate female.

The major characteristics showing female were as follows; no prominent super orbital ridge, an erect slope of forehead, flat surface of skull vault, less prominent occipital process, small mastoid processes and so on.

XI. ESTIMATION OF AGE AT DEATH:

No attrition on each tooth of upper jaw was observed. Palatal suture were not fused yet. But dentition was already permanent one. Based on these findings and dental X-ray examination, age of the skull was estimated about the latter half of 10's (17± 2 years old).

XII. BLOOD TYPE:

Not examined.

See the pathologist examination report.

XIII. STATURE ESTIMATION (INCLUDING PROPORTION):

Not examined

XIV. ESTIMATION OF BODY BUILD:

From the attachment of masticatory muscles, it seemed that had a less muscularity.

XV. CRANIO-FACIAL CHARACTARISTIC:

From the measurement values, cranio-facial characteristics of this skull was medium to high skull. Forehead was classified into narrow. As the breath against the length of the skull was comparatively large, the shape of the skull was classified into hyper-rounded.
From the findings above mentioned it seemed that the face of the victim had a narrow and high forehead and rounded head.

See the form of measurement value of the skull.

XVI. IDENTIFICATION OF HANDEDNESS:

Not examined.

XVII. TRAITS PECULAR TO THE INDIVIDUAL:

(Dental traits)
As mentioned in the column V, upper left second premolar was missing and upper right second premolar was transposed palatinally. Also, left lateral incisor was only slanted platinally (Figs. 8, 9 and 10).

The flat surface was observed on the alveolar septum between the left lateral incisor and the left canine (arrow in Fig. 8), though this region had an area. This feature means that there was a space between these teeth mention above in her life.

(Anthropological traits)
Narrow and high forehead was also one of her peculiar traits.

XVIII.INDIVIDUATION:

The information and photographs of the suspected victim were available as ante mortem records in this case. I got these information stated below from the investigating officer ASP. Sayang Kavang at the mortuary in the Sarawak General Hospital.

The information of the suspected victim was as follows;

Name :	Jong Liu Chin (Chinese)
Date Of Birth :	1/7/1975 (17 years old)
Address :	No. 29, Sebuku Rd, Bau, Kuching Sarawak, MALAYSIA.

Then, this information with regard to Jong Liu Chin is compared with the findings obtained by the examination of the skull. In the result, I found many consistent of resemble findings without any difference between.

On the other hand, I examined the photographs provided by the police. In the detailed examination of the oral region of the girl in the photograph, the following features were made clear.

(1) Her lateral incisor was slightly slanted (arrow An in Fig 11).

(2) The space between the upper left lateral incisor and canine was observed (arrow B in Fig. 11 and arrow An in Fig. 13). Also, the last tooth of the left side observed in the photographs (arrow B in Fig. 13) was morphologically first molar. Therefore, there was not enough space for two premolars. In fact, only one premolar was observed in Fig. 11 (arrow C).

These features were exactly same of the features obtained from the mandible bone of the skull. Then, I superimposed two images of Fig. 12 and Fig. 13. The result was shown in Fig. 14. The size of each corresponding tooth and their positional relation were also exactly superimposed including the features above mentioned. The frequency of the person with these features seemed to be very few. Therefore, the chance that two different persons have the same dental condition like these must be almost zero. It means that the skull is belonging to the girl of the photographs, Jong Liu Chin. Superimpose image also indicated that the position and the size of the nose was consistent with those of nasal opening.

As the next step, I compared the anthropological characteristics of the skull with the photographs. Crani-facial superimpose method was applied to examine the features of forehead and the anatomical relationship between the skull and face of the suspected victim, Jong Liu Chin.
Figures 15 and 16 were the photographs of the skull and then enlarged photographs of figure 6. Figure 17 shows the superimpose images of these two photographs. Though a small mismatched part was observed, this could be explained easily as a small difference of rotation angle and fracture of left temporal bone. Vertical positional relationship between the anatomical parts on the skull and the corresponding parts on the face (top of the head, eyebrows, eyes, nose and ears) was corresponded well. Especially, narrow and high forehead was superimposed without any discrepancy.

Based on these findings, I conclude, in my opinion, that it was sufficient to confirm that the skull which I examined belongs to the suspected victim named Jong Liu Chin.

XIX. SUMMARY:

The skull, which I examined at the mortuary of Sarawak General Hospital on March 23, 1993, appears to be that of a mongoloid female, ranging in age from fifteen to nineteen. The skull was apparently skeletonized artificially. Also, many fractured parts were observed on the skull.

Comparison of the findings obtained from the skull with the suspected victim, Jong Liu Chin, showed that the skull belongs to her.

Detailed descriptions should be referred above.

April 13, 1993

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EXAMINATION REPORT

I. INTRODUCTION :

On September 6, 1993, I had a telephone call from Mr. Zaki Masroh, Criminal Investigation Department (D9) of Royal Malaysian Police. On this occasion, I was asked to examine and identify two unknown skulls which were found at Kg. Bersi Merga., Kijal, Kemaman, Trg, as the request from Mr. Khew Ching Hoi. Then, I accepted his request and informed him that I would apply cranio-facial photo superimpose method for this case.

On September 18, 1993, I arrived at K.L. with the device for superimposition.

On September 20, 1993, Mr. Khew Ching Hoi, The Director, Criminal Investigation Department, Royal Malaysia Police asked me again to examine the two skulls above mentioned with a formal requesting letter. I told him that the examination would be conducted at the Bukit Aman Police Headquarters.

On September27, 1993, I received two color photographs of a male suspected victim named Tan Kim Ann and two color photographs of a female suspected victim named Liew Poh Swan from Insp. Roni B. Abdul Rahim at the CID D9 office, the Bukit Aman Police Headquarters in Kuala Lumpur.

On September 28, 1993, the two skulls were brought to the Bukit Aman Police Headquarters by Dr. Abdul Rahman, Mr. Khew Ching Hoi, Dr. Phrabhakaran Nambiar who is a Forensic Dentist, Insp. Roni, ASP Zaki and Kons. Razaki. The two skulls were registered as Body A and Body B respectively. After the Forensic Anthropological Examination, Forensic Odontological examination was done by Dr. Phrabakaran. After both examinations were finished, I asked the photographers of the Bukit Aman Police to make the measurement values of the skulls. These life-size photographs were printed and enlarged under my direction. Then, the each skull and the cranio-facial photo superimpose method using my device.
The results were photographed.

Based on the results of Forensic Anthropological examination and Cranio-facial photo superimposition, this examination report was prepared. For making it easy to understand, I prepared two examination reports, that is, one is for the unknown body A and other is for in known body B. This is the report for the unknown body A.

Figure 1 is the examination form of skeletonized body consisting of the items such as name or unknown body number, date of discovery, place of discovery, police reference and so on and the information recorded on this form are the ones of body A.

BONES RECOVERED:

I just examined the skull of body A (Fig.2). Therefore, I do not have any idea about all of the other bones belonging to Body A, which were recovered from the scene.

See the report by forensic pathologist.

CONDITION:

I do know the condition of the skull (fresh, decomposed, skeletonized or burned).
However, the skull as the material of my examination was almost skeletonized 9Fig.2).

IV. PATHOLOGIST CONDITIONS:

Not examined

Refer the report by forensic pathologist.

V. MALFORMATION (INCLUDING HEALED FRACTURE):

As far as I examined the skull, I could not find any malformation on it. But I did not observe all of the bones recovered.

Refer the report by forensic pathologist.

VI. TRAUMA:

About the trauma on the skull, the report by forensic pathologist should be referred.

VII. CAUSE OF DEATH:

Not examined.

Refer the report by forensic pathologist.

VIII. TIME LAPSE SINCE DEATH:

Not detected.

Refer the report by forensic pathologist.

IX. RACE IDENTIFICATION:

Morphological features of the skull such as the shape of the skull, eye and nasal openings, flatness of the face, dentition is available for race

identification. Also, indices based on the measurement values obtained by metrical study of the skull are used for the same purpose.
Morphological features of the skull of body a showed flat face and dull margin of the base of nasal openings. The shape of orbit is rounded. The lateral incisors of upper jaw were "shovel shaped". The trait occurs in Mongoloid populations with high frequency. Furthermore indices by measurement values showed the rounded skull and flat face.

These characteristics above mentioned indicate that the victim belongs to the Mongoloid group.

X. DETERMINATION OF SEX:

The skull is the most important area for sex estimation after the pelvis. Generally, the marks of sex on the skull may be summarized by saying that males are most robust than female.

In this case, from the lateral view of the skull, prominent super orbital ridge, inclined frontal bone, large mastoid process of the external surface of the mandibular angle and in the relief of the temporal bone and (Fig. 2-F). From the frontal view, wider zygomatic arch and robust image were observed (Fig. 2-L). These features obviously indicate that the victim was that of a male.

In addition to these morphological features, I measured the skull with each measurement item shown in Table 1-1 and 1-2. The values of some of the items were compared with the mean values of Japanese male and female (Table 2). The result also supported the conclusion obtained from the morphological examination.

XI. ESTIMATION OF AGE AT DEATH:

Age of the skull was estimated as 20's based on the findings of the sutures and dental attrition. Namely, the attrition was limited to the enamel and could not see the dentin on the occlusal surface of the dentition. Also, palatal sutures were not fused and especially incise suture was still existent. These findings indicate less than 30 years old.
For further information, dental and X-ray examination should be required.

XII. BLOOD TYPE:

Not detected.

Refer the report by forensic pathologist.

XIII. STATURE ESTIMATION (INCLUDING PROPORTION):

It is possible to estimate the stature of the victim from the long bones such as humerus, radius, ulna, femur, tibia and fibula. But I did not examine the post-cranium in this case. Therefore, stature and proportion of this victim was not estimated.

XIV. ESTIMATION OF BODY BUILD:

Not examined.

Refer the report by forensic pathologist.

XV. CRANIO-FACIAL CHARACTARISTIC:

Based on the measurement values of the skull (Table 1-1 and 1-2), each index showing the characteristics of the head and face was calculated (Table 1-3). Table 1-4 to 1-6 show the criteria of classification of each index. From the index values, the head of this victim was classified as rounded and high skull, and narrow forehead. In the same manner, the face was classified into medium and flat face group.

Orbital and nasal index showed respectively that the victim had a high orbit and narrow nose.

XVI. IDENTIFICATION OF HANDEDNESS:

Not examined.

XVI. TRAITS PECULAR TO THE INDIVIDUAL:

The most peculiar traits of this skull are a very narrow forehead. The measurement value of least frontal breadth (Martin No.7) was 92.0 mm (Table 1-1). It means that his forehead was also narrow when he was alive. Furthermore, prominence of the brow ridges (Fig. 2-L & R).

XVII. INDIVIDUATION:

I received two ante mortem color photographs of a suspected victim named Tan Kim Ann as I mentioned in chapter I. INTRODUCTION (Figs. 3-L & 4-L). The information about Tan Kim Ann is as follows;

Sex	:	Male
Nationality	:	Chinese
Date of Birth	:	29th April, 1968

This information is corresponding to the findings obtained from the skull.

In the next step, I reproduced the photographs from these color photographs using the black and white film for getting the life-size photographs which could be used for comparison with the skulls by superimposition. Figures 3-R and 4-R are the black and white photographs corresponding to the color photographs. Figure 5 is the enlarged photograph of the face part from Fig. 3-R. Narrow forehead and prominence of the brow ridges which were observed on the skull could be seen on his face. Also, frontal teeth can be seen.

Then, I carried out the cranio-facial photo superimpose method. The concept and the device are shown in figures 6 and 7. After getting a life-size photograph of Tan Kim Ann, I set up the skull and the photograph in each place in figure 6 and got the exactly same angle and direction of the skull comparing two images through the two way mirror. Figure 8 shows the suspected victim (L), the skull after getting the same orientation to the ante mortem photograph (M).

Figure 9-L and 9-R are the photographs of the suspected victim and the skull enlarged with same magnification. Then, I printed the skull's image on the paper and the suspected victim's image on the transparent film. Figure 10 shows superimposition of these two images. The features observed on the skull and the face of the suspected victim is exactly matched. Also, Upper lateral incisors and canines are superimposed precisely. Furthermore,

positional relationship in anatomy between eye brows, eyes, nose, mouth, margin of the lower jaw and ears on his face and super orbital ridges, orbits, nasal opening, teeth, chin and external acoustic foreman on the skull are corresponding, respectively.

Based on these findings, I can conclude positively, in my opinion, that it was sufficient to confirm that the skull of body A which I examined belongs to the suspected victim named Tan Kim Ann.

XIX. SUMMARY:

The skull of body A, which I examined at Bukit Aman Police Headquarters on 28th of September, 1993, appears to that of mongoloid male aged 20's. The skull also showed the narrow forehead and prominence of the brow ridges.

Comparison of the findings obtained from the skull with the ones of the suspected victim, Tan Kim Ann, showed that the skull and the suspected victim have the same features.

Then, superimpose method for comparison between the skull and the suspected victim was introduced. The result showed positively that the skull belongs to him.

Detailed description should be referred above.

18th October, 1993

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EXAMINATION REPORT

I. INTRODUCTION :

On September 6, 1993, I had a telephone call from Mr. Zaki Masroh, Criminal Investigation Department (D9) of Royal Malaysian Police. On this occasion, I was asked to examine and identify two unknown skulls which were found at Kg. Bersi Merga., Kijal, Kemaman, Trg, as the request from Mr. Khew Ching Hoi. Then, I accepted his request and informed him that I would apply cranio-facial photo superimpose method for this case.

On September 18, 1993, I arrived at K.L. with the device for superimposition.

On September 20, 1993, Mr. Khew Ching Hoi, The Director, Criminal Investigation Department, Royal Malaysia Police asked me again to examine the two skulls above mentioned with a formal requesting letter. I told him that the examination would be conducted at the Bukit Aman Police Headquarters.

On September27, 1993, I received two color photographs of a male suspected victim named Tan Kim Ann and two color photographs of a female suspected victim named Liew Poh Swan from Insp. Roni B. Abdul Rahim at the CID D9 office, the Bukit Aman Police Headquarters in Kuala Lumpur.

On September 28, 1993, the two skulls were brought to the Bukit Aman Police Headquarters by Dr. Abdul Rahman, Mr. Khew Ching Hoi, Dr. Phrabhakaran Nambiar who is a Forensic Dentist, Insp. Roni, ASP Zaki and Kons. Razaki. The two skulls were registered as Body A and Body B respectively. After the Forensic Anthropological Examination, Forensic Odontological examination was done by Dr. Phrabakaran. After both examinations were finished, I asked the photographers of the Bukit Aman Police to make the measurement values of the skulls. These life-size photographs were printed and enlarged under my direction. Then, the each skull and the cranio-facial photo superimpose method using my device.
The results were photographed.

Based on the results of Forensic Anthropological examination and Cranio-facial photo superimposition, this examination report was prepared. For making it easy to understand, I prepared two examination reports, that is, one is for the unknown body A and other is for in known body B. This is the report for the unknown body B.

Figure 1 is the examination form of skeletonized body consisting of the items such as name or unknown body number, date of discovery, place of discovery, police reference and so on and the information recorded on this form are the ones of body B.

II. BONES RECOVERED:

I just examined the skull of body B (Fig.2). Therefore, I do not have any idea about all of the other bones belonging to Body B, which were recovered from the scene.

See the report by forensic pathologist.

III. CONDITION

I do know the condition of the skull (fresh, decomposed, skeletonized or burned).
However, the skull as the material of my examination was almost skeletonized (Fig.2).

IV. PATHOLOGIST CONDITIONS:

Not examined

Refer the report by forensic pathologist.

V. MALFORMATION (INCLUDING HEALED FRACTURE):

As far as I examined the skull, I could not find any malformation on it. But I did not observe all of the bones recovered.

Refer the report by forensic pathologist.

VI. TRAUMA:

About the trauma on the skull, the report by forensic pathologist should be referred.

VII. CAUSE OF DEATH:

Not examined.

Refer the report by forensic pathologist.

VIII. TIME LAPSE SINCE DEATH:

Not detected.

Refer the report by forensic pathologist

IX. RACE IDENTIFICATION:

Morphological features of the skull such as the shape of the skull, eye and nasal openings, flatness of the face, dentition is available for race identification. Also, indices based on the measurement values obtained by metrical study of the skull are used for the same purpose.

Morphological features of the skull of body B showed dull margin of the base of nasal openings. As same as the skull of body A, the shape of orbit is rounded. The incisors of lower jaw were slightly "shovel shaped,". This trait occurs in Mongoloid populations with high frequency.

Furthermore, indices by measurement values showed the hyper rounded skull.

These characteristics above mentioned indicate that the victim belongs to the Mongoloid group. Nasomalar index, however, showed clear-cut face.

X. DETERMINATION OF SEX:

The skull is the most important area for sex estimation after the pelvis. Generally, the marks of sex on the skull may be summarized by saying that males are most robust than female.

In this case, from the lateral view of the skull, no super orbital ridge, vertical frontal bone, small mastoid process of the temporal bone and weak muscle markings in the region of the external surface of the mandibular angle and in the relief of the temporal line (Fig.2-R).

From the frontal view, narrower zygomatic arch and gracile image were observed (Fig.2-L). These findings are the characteristics of a female.

In addition to these morphological features, I measured the skull with each measurement item shown in Table 1-1 and 1-2. The values of some of the items were compared with the mean values of Japanese male and female (Table 2). Main values with some exceptions also supported the conclusion obtained from the morphological examination. These exceptions are caused by the longer width of the skull. It means the victim seemed to have broad head.

XI. ESTIMATION OF AGE AT DEATH:

Age of the skull was estimated as 20's based on the findings of the sutures and dental attrition. Namely, the attrition was limited to the enamel and could not see the dentin on the occlusal surface of the dentition as same as the skull of body A.

Also palatal sutures were not fused and especially incisal suture was still existent. These findings indicate less 30 years old.

For further information, dental and X-ray examination should be required.

XII. BLOOD TYPE:

Not detected.

Refer the report by forensic pathologist.

XIII. STATURE ESTIMATION (INCLUDING PROPORTION):

It is possible to estimate the stature of the victim from the long bones such as humerus, radius, ulna, femur, tibia and fibula. But I did not examine the post-cranium in this case. Therefore, stature and proportion of this victim was not estimated.

XIV. ESTIMATION OF BODY BUILD:

Not examined.

Refer the report by forensic pathologist.

XV. CRANIO-FACIAL CHARACTARISTIC:

Based on the measurement values of the skull (Table 1-1 and 1-2), each index showing the characteristics of the head and face was calculated (Table 1-3). Table 1-4 to 1-6 show the criteria of classification of each index.

From the index values, the head of this victim was classified as rounded and high skull, and narrow forehead. In the same manner, the face was classified into medium and flat face group.

Orbital and nasal index showed respectively that the victim had a high orbit and narrow nose.

XVI. IDENTIFICATION OF HANDEDNESS:

Not examined.

XVI. TRAITS PECULAR TO THE INDIVIDUAL:

The most peculiar traits of this skull are a broad head with narrow forehead and face. The measurement values related to the width of the skull are comparatively large for female. However, forehead, face and nose are narrow. Especially, nasal breadth is very narrow (22 mm), whereas nasal height is very high (54 mm). It means she had a long nose vertically.

XVII. INDIVIDUATION:

I received two ante mortem color photographs of a suspected victim named Liew Poh Swan as I mentioned in chapter I. INTRODUCTION (Figs. 3-L & 4-L). The information about Liew Poh Swan is as follows;

Sex	:	Female
Nationality	:	Chinese
Date of Birth	:	23rd January, 1969

This information is corresponding to the findings obtained from the skull.

In the next step, I reproduced the photographs from these color photographs using the black and white film for getting the life-size photographs which could be used for comparison with the skulls by superimposition. Figures 3-R and 4-R are the black and white photographs corresponding to the color photographs.

The features of the head and face estimated from the skull are all observed on her head and face of the ante mortem photographs.

Then, I carried out the cranio-facial photo superimpose method. The concept and the device are shown in figures 5 and 6.

After getting a life-size photograph of Liew Ph Swan, I set up the skull and the photograph in each place in figure 5 and got the exactly same angle and direction of the skull comparing two images through the two way mirror. Figure 7-L and 8-R shows the suspected victim and the skull after getting the same orientation to the ante mortem photograph.

Figure 9-L and 9-R are the photographs of the suspected victim and the skull enlarged with same magnification. Then, I printed the skull's image on the paper and the suspected victim's image on the transparent film. Figure 10 shows superimposition of these two images. The features observed on the skull exactly corresponds to the face of the suspected victim are exactly matched. Also, Upper canines are superimposed precisely. Furthermore, positional relationship in anatomy between eye brows, ayes, nose, mouth, margin of the lower jaw and ears on his face and super orbital ridges, orbits, nasal opening, teeth, chin and external acoustic foreman on the skull are corresponding, respectively.

Figures 11 and 12 are the same manner of the comparison with figures 7 and 8. Even though the orientation of the face in figure 11-L is different from the one in figure 7-L, the face and the skull are well superimposed without any discrepancy.

Based on these findings, I can conclude positively, in my opinion, that it was sufficient to confirm that the skull of body A which I examined belongs to the suspected victim named Tan Kim Ann.

XIX. SUMMARY:

The skull of body B, which I examined at Bukit Aman Police Headquarters on 28th of September, 1993, appears to that of mongoloid

Male aged 20's. The skull also showed the narrow forehead and prominence of the brow ridges.

Comparison of the findings obtained from the skull with the ones of the suspected victim, Tan Kim Ann, showed that the skull and the suspected victim have the same features.

Then, superimpose method for comparison between the skull and the suspected victim was introduced. The result showed positively that the skull belongs to him.

Detailed description should be referred above.

18th October, 1993

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